IDENTIFYING THE CRITICAL SUCCESS FACTORS IN THE IMPLEMENTATION OF ENTERPRISE RESOURCE PLANNING (ERP) IN THE ZIMBABWE ELECTRICITY ENERGY SECTOR

BY

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ABSTRACT

The study identified CSFs and their prioritisation in ERP implementations in the Zimbabwean electricity energy sector context. This research paper discusses key recommendations for improving future Enterprise Resource Planning (ERP) implementations based on insights from an exploratory qualitative single case study in the Zimbabwean electricity sector. The design was an interpretive case study research with the data collected using face to face and telephonically interviews from eighteen participants belonging to four project role groups of project managers, module owners, supper (key) users and end users. The researcher conducted in depth interviews with four role groups. The following critical success factors were identified and discussed: Business Plan and Vision, Business Process Reengineering, Change Management, Communication, ERP System selection, ERP Team composition and competence, External Expertise, IT Infrastructure, Project Management, Top Management Support and Commitment, Training and Education, User Involvement and Vendor Support. The findings from this study can be used to contribute additional insight on the implementation of ERP systems in the electricity energy sector in the Zimbabwean context. This paper is significant because identification and prioritisation of critical success factors help organisations institute appropriate strategies to enhance the successful implementation of ERP system and increase the realisation of the benefits of ERP systems. Management must be able to use the rankings of the CSFs for resource allocation and improved human management.

DEDICATION

I dedicate my dissertation work to my family and many friends. A special feeling of gratitude to my loving wife.

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Bless the Lord Almighty who made the opportunity possible.

To my wife Elizabeth, thank you for releasing me to do what I need to do and supporting the vision in every way imaginable. There could never have been another person to embark on this journey with me as you did and I take pleasure in that and honour you. I couldn't have asked for someone better than her to partake in this journey with me. Thank you for your love, support, motivation, and all the attributes of your being that helped me make a success of this course and project.

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To all the participants, without your cooperation, this document would not have been realised

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LIST OF ABBREVIATIONS

AIPM – Australian Institute of Project Management

BOM – Bill of Materials

BPR – Business Process Re-engineering

CFS – Critical Success Factor

CIO – Chief Information Officers

ERP – Enterprise Resources Planning

GMB -Grain Marketing Board

HCCL- Hwange Colliery Company Limited

ICT- Information Communication Technology

IT – Information Technology

IQ – Information Quality

MIS- Management of Information Systems

REA – Rural Electrification Agency

SAP – Systems Application Products

SEM – Structural Equation Modelling

SQ – System Quality

TOE – Technology – Organisation - Environment

TTCS – Twenty Third Century Systems

ZESA – Zimbabwe Electricity Supply Authority

ZIMRA – Zimbabwe Revenue Authority

ZMDC- Zimbabwe Mineral Development Company

CHAPTER 1: INTRODUCTION TO THE STUDY

1.0 Introduction

There has been a proliferation of information technology over the past decade. The development of information and communication technologies (ICTs) has provided organisations with vast opportunities to improve operational efficiency (Alenezi *et al.*, 2015). Many organisations have adopted Management of Information Systems (MIS) in an attempt to gain competitive advantage and increase operational efficiency. The mostly adopted management information system is the Enterprise Resources Planning system (ERP). According to Davenport (1998), the adoption of ERP has diffused so rapidly and extensively especially across large organisations based on the purported benefits principally in terms of improving productivity and speed of information processing. Kumar and Van Hillegersberg (2000) defined Enterprise Resource Planning (ERP) systems as configurable information systems packages that integrate information and information-based processes within and across functional areas in an organization. Mutongwa and Rabah (2013) define an ERP system as the technology that provides the unified business function to the organization by integrating the core processes. Tarhini *et al.* (2015) describe ERP as a package of business software that enables a company to manage the efficient and effective use of resources like materials human resources and financial resources. They posit that ERP systems provide organisations with vast opportunities for operational cost reduction and simulate revenue growth. Tarhini, Ammar and Tarhini (2015) say there is need for organisations to have the ability to manage internal processes and the need for business process standardisation to streamline their operations and improve efficiency of these processes. These are some of the factors for the adoption of ERP systems. Furthermore Hasheela-Mufeti and Smolander (2017) noted that the ERP system has become an essential part of many organisational practice guiding business operations.

Despite the benefits that are realised from ERP systems Asemi and Jazi (2010a) noted that the implementation of these systems can be challenging because of their complex nature.

The difficulties encountered and high failure rate in the implementation of ERP systems have been observed by many researchers. According to Grabski *et al.* (2011) it is reported that three quarters of the ERP projects were judged to be unsuccessful by the implementing firm. About 90% of ERP implementation are late and over budget (Ahmad and Cuenca, 2013). Despite the fact that ERP implementation is risky, the market of ERP is growing rapidly (Ifinedo, 2006). Organisations small and large have continued implementing ERP systems regardless of the low rate of implementation success (Wang *et al.*, 2008). In order for successful implementation to be realised, certain characteristics, conditions or variables called factors have to be sustained, maintained and managed to have an impact on the success of a project. The factors affecting project success are called Critical Success Factors (CSFs). CSFs are defined as those functions that must go well in order to ensure success for an organization (Rockart, 1979). Asemi and Jazi (2010b) define Critical Success Factors (CSFs) as those aspects that should be done right in order for the ERP implementation process to achieve a high degree of success. Meanwhile Pinto and Slevin (1987) regarded (CSFs) as those factors which if addressed accordingly will significantly improve project implementation chances. Tarhini *et al.* (2015) identified a number of factors that are frequently cited as Critical Success Factors (CFS) to the implementation of ERP projects. Among them include top management commitment and support, training, education, project management, clear vision, careful change management and interdepartmental communication. The ERP implementation literature has provided a solid theoretical background to ERP critical success factors (Davenport, 1998). Researchers suggest that understanding the relationships between factors for implementation success is necessary (Tsai *et al.*, 2011). Having the (ERP) systems implemented successfully would have positive impact and benefits on the organisation.

While ERP is probably the most rapidly growing system in the area of operations today, organisations in developing countries in their quest to be competitive and satisfy their clients have adopted and implemented ERP system as the solution. According to studies by van Vuuren and Seymour (2013), the implementation displayed a high failure rate. Although studies have been carried out in many parts of the world, in Africa and other developing countries remain understudied (Momoh *et al.*, 2010). However, the researcher's

review of literature suggests that there seems to be insufficient research investigating the factors influencing the ERP implementation in developing economies (Shaul and Tauber, 2013; Bailey *et al.*, 2017). Zhang *et al.* (2003) pointed that in order to reduce the failure rate, it is important to identify and evaluate critical success factors (CSFs) for appropriate and successful implementation of the ERP systems.

The purpose of this research is to empirically identify which critical success factors are most critical to the ERP system implementation process in the context of the Zimbabwean economy. The research will address the critical success factors of ERP system implementation across medium to large organisations who have implemented ERP systems in Zimbabwe. It will also explore how the factors influence successful ERP implementation in developing economies.

1.1 Background to the study

Many ERP systems that were developed and implemented were based on the dictate of the best practice of developed countries. Of recent there has been a growing trend in the developing countries in the implementation but with low successful implementation rate (Scholtz and Atukwase, 2016). Studies have shown increase in the failure rate in the implementation stages of ERP in various parts of developed and developing countries (Ramburn and Seymour, 2014). According to Monk and Wagner (2012), up to 75% of ERP implementations are considered a failure because they miss to deliver the promised and expected benefits. In their research Asemi and Jazi (2010b) found out that about 90% of ERP implementations are late or over budget. These assertions confirm that ERP implementation is risk, despite this existing threat the market of ERP system is growing rapidly. Regardless of the high failure rates thousands of companies have implemented or are in the process of implementing ERP systems (Dwivedi *et al.*, 2015). In a research report by Panorama Consulting Solutions (2018) ERP report, 42% of the respondents deem their ERP implementation a success. In the United States of America 60% of the firms have implemented ERP systems and 51% success rate was recorded (Asemi and Jazi, 2010b).

Like most developed countries African countries are endowed with a specific context. The African context is characterised by economic incapacity, limited infrastructure, limited human skill and a particular culture (Al-Debei and Al-Lozi, 2012). Given the noted complexity and risks related to ERP systems Mukwasi and Seymour (2015) argued that implementation in an African context enhances the difficult of implementation. ERP implementation in developing countries faces specific difficulties over and above those experienced by developed countries. Various researches carried out in Africa have revealed ERP implemented failures for developing economies (Tobie *et al.*, 2016). The high failure rates of the implementation of ERPs system by an institution suggest a challenge in understanding the critical success factors for successful implementation.

Zimbabwe as a developing country has adopted and implemented ERP systems in some organisations. In this regard Kambarami, Mhlanga and Chikowere (2012) observed that quite a number of large and small organisations have implemented ERP systems. They say large size companies notably Zimbabwe Revenue Authority (ZIMRA), TelOne, British American Tobacco, (BAT), Unilever South East Africa (SEA) have implemented ERP (SAP Business Suite (R/3). Medium size companies that have implemented SAP business (R/3) are Dairiboard Zimbabwe, Tetrad, Sakunda, Zimbabwe Mineral Development Company (ZMDC) and Nestle Zimbabwe. Of great importance was that Kambarami and company also noted that Hwange Colliery Company Limited (HCCL) and Grain Marketing Board (GMB) have implemented ERP systems but it has not been fully utilised. By the time of this study the electricity energy sector acquired and implementing SAP Business (R/S).Zimbabwe Electricity Supply Authority, (ZESA) officially called ZESA Holdings (Pvt) LTD., is a state-owned company whose task is to generate, transmit, and distribute electricity in Zimbabwe.

Following the passing of two Acts by the Parliament of Zimbabwe, the Electricity Act (Chapter 13:19) and the Rural Electrification Fund Act (Chapter 13:20), comprehensive reforms have since been experienced in the electricity industry. A separate Rural Electrification Fund, a Board and an agency, the Rural Electrification Agency (REA) was set up under the Rural Electrification Fund Act, which was passed in January 2002. The

Agency is administering a special fund formed under this Act to finance rural electrification projects. The mandate of REA is to construct electricity distribution infrastructure to the disadvantaged rural areas of Zimbabwe before handing it over to the subsidiaries of ZESA for managing and maintenance.

The electricity energy sector in Zimbabwe which is dominated by the Zimbabwe Electricity Supply Authority (ZESA) and the Rural Electrification Agency (REA) also implemented the (SAP) Business Suite (R/S). REA implemented a complete package the (SAP) Business Suite (R/S). The modules taken on board were Financial management module, Projects System module, Project portfolio Management module, Human Resource management module, Materials management module, Business intelligent module and fleet and maintenance modules. A vendor supplied Systems Application Products (SAP) was preferred over other ERP systems available on the market. SAP dominated the Zimbabwean market as most companies both in private and public sectors preferred SAP ERP (Kambarami *et al.,* 2012). The implementation of SAP in REA experienced some challenges. The project which was started in 2015 experienced a one and half year delay. The project was scheduled for completion by the end of 2017.The delayed completion has caused cost overruns as more financial resources had to be provided for during the extended implementation periods. Despite the investments done, the project failed to achieve organisational target of having a running ERP system by the set date. Vayyavur and Technology (2015) state that a large number of ERP implementations have failed to achieve organisational targets. They say the implemented functionality as at the end of 2018 was below 50% of the desired business requirements as integrations of the business processes was still to be commissioned and signed off by the consultant. They found that in the middle of the implementation the organisation encountered some technical issues which emerged. Servers and workstations were revised to accommodate the new system and new and modern ones were purchased to replace the old ones. The internal internet was also modernised to the required speed and bandwidth of the internet access. These requirements were underestimated and resulted in delays. Another issue was the data quality. In fact, replacing a legacy system and consolidating disparate solution are two common challenges the organisation faced. The old data that have been used and stored for

many years appeared inappropriate or even incorrect for the new system. This issue is particularly symptomatic to organisations implementing ERP for the first time when transferring their legacy data into the new system from excel spreadsheets, manual records and old disparate applications. The most difficult part involved shifting data from the current system to another at the stage of switching on because of the huge volume of transactions. This led to transactional problems to occur. The notable one was that the values between the systems were incorrect, so comparisons were made on the values from the legacy system with those on the new system such as inventory levels.

Functionality issues were noticed during the 'Go Live' stages of the different modules. The Projects closures had to be done outside the system as the Project System Module and Financial Module could not share information necessary for final costs compilations. The Human Resources Module could not accommodate the payroll calculation for temporary employees' wages as the customisation focused mainly on permanent employee. ERP implementation brought significant changes to the organisation's conventional business model and the day-to-day practices that it has been using for years or even decades. New approaches to data reporting and mining had to be adopted and this required a new managerial approach to be established. The business model and practices requirements changed because of the new real time availability of opportunities and data availability. Some of the employee responsibility levels were drastically increased as the new system is more difficulty to fix erroneous data or typing errors. More importantly ERP system implementation is more than just a simple change of data format or and an update of user interface. It is a great opportunity to refresh business and bring new ideas as well as laying a strategic foundation for the future of the organisation. The success of the implementation of ERP system depends upon the users. The users of the system are human beings who were used to processes with one software and are more likely to find it difficult to switch to a new system especially if the benefits of the methods are not immediately obvious or forthcoming. Some functionality and processes did not get the appreciation the implementation team expected. The implementation team expected a high acceptance of the system in areas that provided better functionality to the old system. At the middle management level, resistance to migrate from the company's convectional business model

took centre stage. The running of the two systems at the same time was adopted leading to a prolonged migration process. The implementation responsibility was left with the IT and technical staff and this complicated the implementation as the business re-engineering process is a multi-disciplinary task. As a result, technical challenges manifested in the Business Intelligence module as reports could not be generated as the information has to be collated from the various modules. It was also discovered that the integration of the various business process was not adequately configured. More time was spent on revisiting the business blue prints of the business processes. These issues weighed negatively on the functionality of the system as desired results could not be realised at the expected time period. Each time the consultant customaries some new aspects of the business processes, an extra cost would be charged and resulted in cost overruns.

The above phenomenon was also experienced by other public enterprises as well, such as National Social Security Authority (NASSA). NASSA in its quest to improve operational efficiency adopted SAP. The project was started in 2013 and experienced a two and half year delay. One of the weekly business publications, the Zimbabwe Independent newspaper on May 11 2016 reported that the NASSA's $10million project was only completed in 2016. It is of great importance to note that the implementation of SAP in most organisations in Zimbabwe was carried out by Twenty Third Century Systems (TTCS) a regional SAP consultancy company. The cause of the delay was apparently a project management problem of the consultant blaming the company for not creating the necessary conditions for the completion, while the company executives accused the consultant for not delivering as promised. Maditinos *et al.* (2011) noted that most of these failures are not caused by the ERP software but the complexity and massive changes caused by ERP in an organization. In support of the view Helo *et al.* (2008) as cited by Vayyavur and Technology (2015) observed that most of the major impediments to successful implementation are not technologically related issues such as compatibility, technological complexity and standardisation, but are organisational and human related issues including resistance to change, organisational culture and business processes.

Previous researchers have focused on ERP implementation in developed countries. However, the majority of studies failed to take into account the context in which the ERP systems are implemented in developing African countries such as the case of Zimbabwe. Different researchers have tried to recognise those critical success factors affecting implementation in developed countries. The large difference between ERP system implementation rates in developed countries and developing countries provides a need to examine generic and unique factors that affect ERP implementation in Zimbabwe. Although implementation challenges are perceived to be to some extend universal, according to Momoh *et al.* (2010) there are unique features characterising each part of the world with regard to implementation of Information Communication Technology (ICT) and that is mainly due to environmental differences. They further pointed that ICT implementation does not only deal with technologies and information context but their deliverables are shaped by the associated social or cultural context. Besides great deal of customisation effects, over these prescriptions for the best fit within different organisational external and internal environment play a significant role in the determination of CSFs. It has been observed in the literature that the importance of critical factors varies according to the context (Momoh *et al.*, 2010).

This research report intends to contribute to this gap by bringing to light the critical success factors in the actual context of ERP implementation in Zimbabwe. In this study, an empirical investigation into ERP critical success factors from the perspective of key stakeholders, the management, the project team and the consultants who are involved in the implementation process is undertaken. The research should help managers identify what factors they should focus upon for success in project implementation. It also helps to ensure that those significant factors will receive careful and continuous management scrutiny. Furthermore, this study attempts to investigate the critical success factors affecting enterprise resource planning (ERP) systems implementation success in Zimbabwe electricity energy sector with focus on both generic and unique factors.

1.2 Problem statement

Evidence from other studies found that ERP implementation success is not guaranteed unless scrupulous attention is given to all critical factors. ERP systems interact with organisational operations and so their success is basic to optimal and sustained organisational performance. ERP systems by their nature are complex and their implementation has more chances of failure (Ahmad and Cuenca, 2013). There is high failure rate of ERP implementation and organisations are spending huge sum of money but are fully benefiting. There is limited empirical evidence of the factors that drive the successful implementation of ERP in Zimbabwe.

1.3 Research questions

In order to address the research problem stated above, the research questions for this study are as follows:

(a) What are the critical success factors which enhance the successful implementation of ERP systems?
(b) What are the critical success factors to prioritise when implementing ERP systems in the electricity energy sector in Zimbabwe?
(c) Which strategies can the Zimbabwe energy sector apply to improve ERP implementation success?

1.4 Research aim

The aim is to investigate and identify the Critical Success Factors (CSFs) in the implementation of ERP systems in Zimbabwean electricity energy sector.

1.5 Research objectives

To fulfil the aim of the study the objectives have been outlined as follows:

(a) To identify the critical success factors which enhance the successful implementation of ERP systems.
(b) To analyse critical success factors to prioritise when implementing ERP systems in the electricity energy sector in Zimbabwe.
(c) To recommend strategies that the Zimbabwe energy sector may apply in improving ERP implementation success.

1.6 Significance of the study

The research will be useful to potential clients of ERP systems, to assess the critical success factors that they should consider in the implementation of ERP systems in public enterprises in developing countries. The research will provide an understanding of the critical success factors to prioritise in order to improve ERP implementation in developing countries with a special focus on Zimbabwean electricity energy sector. The research will complement the body of knowledge on ERP system implementation and ICT in the electricity energy sector. In addition, the research could be a good map for searching topics for further studies in the implementation of ERP in developing countries. The research will summarise the key CSFs which are pertinent in the ERP implementation in a developing economy environment. Lastly, the recommendations for practitioners and professionals will be given as lessons learned and issue or issues will be identified for further research.

1.7 Structure of the report

Chapter One: Introduction.
This chapter will contain the introductory statements as well as a background to the study whereupon the problem statement is stated. The subsequent research questions, proposition, aims and objectives, the research methodology, and limitations and delimitations are also introduced and described.

Chapter Two: Literature review.

This chapter will provide a literary review of the subject of IT investment appraisal metrics and benefits realisation including the relationships between these same variables. This chapter serves to answer the question: What has the research in this field revealed?

Chapter Three: Research methodology.

This chapter will describe and provide insight into the general procedural research strategies. It will explain why a particular methodology will be chosen and how best it will try to answer the research questions. Data collection methods will also be discussed.

Chapter Four: Analysis of data.

This chapter will contain the summary of data collected and the analysis and presentation of the results, from which the conclusions and recommendations will be drawn.

Chapter Five: Conclusion and recommendations.

The chapter will contain the conclusions drawn from the analysed data and from which recommendations for areas requiring further research and/or development will be highlighted.

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

In the previous chapter the background to the study was discussed leading to the problem statement and research objectives. This chapter will present a conceptual framework and a theoretical framework for the study and discuss relevant literature. The literature review will guide the researcher in the identification of CSFs for the successful implementation of ERP system in the energy sector in Zimbabwe.

2.1 Conceptual framework

This section discusses how CSFs developed and their definition.

2.1.1 Critical Success Factors

Rockart (1979) defines the CSF as limited to the number of areas in which satisfactory performance determines the overall successful and competitive performance of the company or firm. Another definition by Leidecker and Bruno (1984) states that CSFs are the characteristics which must be correctly managed within an organisation for it to be competitively operational in its given industry. These characteristics are variables which means they are not to be taken for granted but that managers must deliberately work to sustain their output for the preferred company performance to be realised. Pinto and Slevin (1987) found that CSFs as those factors which when companies pay attention to them they significantly improve project implementation chances.

Digman (1990) states that CSFs are those areas where operations must be well monitored for the business to flourish. Grabski, Leech and Schmidt (2011) consider CSFs as the aspects which departmental manager or company to realise success. Verville *et al.* (2005) state that a single critical factor on its own will not achieve success for an ERP system implementation process as it combines success factors that are in a state of dynamic interaction for the realisation of forecast outcomes. ALdayel *et al.* (2011) have found that

in an ERP system context, CSFs become the selection of activities which need special continuous consideration and planning that are critical in the implementation of an ERP system.

2.1.2 History of CSFs

The CSF approach is a managerial approach that incorporates the role of MIS which was delineated by Daniel (1961) who argued that an IS should focus on small group of success factors. Daniel (1961) identified the CSFs in management literature labelling them as 'success factors' for use in any company in a particular industry. Anthony *et al.* (1972) posit that there is a need to tailor CSFs to specific strategic objectives of an organisation and to the plans formulated by the various departmental managers. Rockart (1979) found that organisations in the same industry may exhibit different CSFs. Rockart (1980) also studied three organisations and gathered data from IS executives. From the study Rockart (1980) found out that executives shared a limited number of CSFs. He pointed out that there are differences which are linked to organisational aspects and time pressures faced by each participating manager at the time of data collection. Ramaprasad and Williams (1998) posit that organisations should understand that CSFs are only indicators. Therefore the performance of organisations must be monitored with guidance from proper interpretation of the CSFs as indicators for obtaining organisational success. According to van der Hoorn (2016), each type of organisation has a unique set of CSFs. As a result there are variations in the CSF importance from project to project as dictated by the lifecycle phases. The set of CSFs is therefore dynamic. This dynamism has led scholars investigating the success factors in different projects to conclude that the CSFs cannot be regarded as universal but are dependent on project type.

2.1.3 CSFs framework

Several approaches were used by different researchers to identify factors related to ERP implementation success. Bradley (2008) researched success factors that are given in the

classical management theory. Earlier on Bradford and Florin (2003) conducted their research on dispersion of information. Wang *et al.* (2007) examined their approach to analyse organisational fit and appropriateness of the ERP system. Al-Debei and Al-Lozi (2012) posit that African countries have varied contexts dominated by low economic production, poor infrastructure and compartmentalised into many cultures. Some of these countries do not have sufficient skills to drive development through industrialisation. Because of these prevailing conditions in Africa, Mukwasi and Seymour (2015) state that implementing ERP systems is associated with impeding complications. The complications raise the problem of defining an efficient way to implement ERP systems within the African context. Many resources are exposed to risk when an organisation decides to embark on IT processes. Planning is crucial so as to achieve efficiency in whatever method is being used to implement ERP system. It must be kept in mind that when the ERP system is being implemented the critical factors need to be identified and monitored so as to ensure organisational success.

2.2 Theoretical framework

A theoretical framework offers a systematic way of approaching a problem in a study. The perceptions and experiences on how the success of ERP implementation is shaped by the context in with the participants are exposed to. Hence a framework offers the possibility to group the success factors according to the context in which they are viewed by the ERP implementers.

The study is underpinned by the ERP Implementation Success Framework proffered by Samuel *et al.* (2013) and is illustrated in Figure 2.1. The framework shows categories that can be used to represent ERP systems.

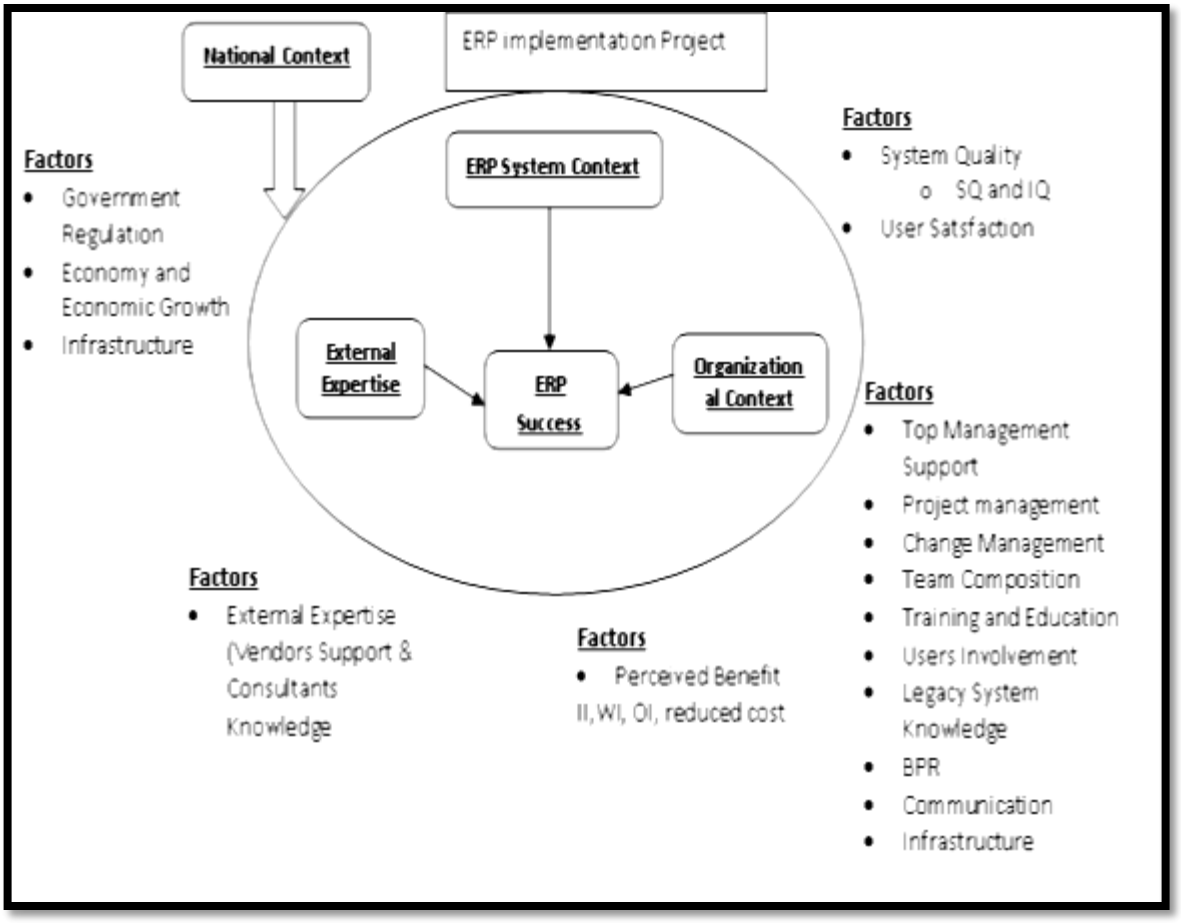

Figure 2.1 The ERP Implementation Success Framework

(Source: Samuel et al, 2013)

The framework Figure 2.1 as proposed by Samuel et al, 2013) is represented by five distinct categories namely National context, Organisational context, ERP system context, External expertise context and ERP success which are discussed in the next section. The following subsections discuss the five categories of the ERP Implementation Success Framework namely National, Organisational, ERP system, External expertise and ERP success context.

2.2.1 National Context

According to ALdayel *et al.* (2011) the implementation of ERP systems in developing countries are subject to organisational factors as well as country or national factors. Huang

and Palvia (2001b) posit that national factors include the state of the economy obtaining in the country, level of development of that country and the regulations governing the business environment. Developing countries such as Zimbabwe are on record of having poor IT facilities which negate ERP adoption. Affected applications include telecommunications with regard to internet and public cell phone networks (The Sunday Mail, 6 October 2019). The theoretical framework under the national context, include the level of economy and economic growth, the status of infrastructure like telecommunication, Internet, mobile telephone, and government regulation towards promoting ICT in the country. Silvius (2008) opines that culture in any nation has an impact on IT perceptions and use.

2.2.2 Organizational Context

According to Samuel *et al.* (2013) ERP system demands that whatever strategy a company is pursuing there must be checks along the way to see how the company is benefitting from each step undertaken. That is how the CSFs factors can be derived or verified. Huang and Palvia (2001b) in their study found that an organization that exhibits poor IT usage and inadequate process management procedures experience factors that impede adoption of ERP systems. They found that ERP systems have to be tackled in certain procedures that the company personnel has to adjust to new ways of doing their business.

Esteves and Pastor (2001) opine that ERP systems have their own type of logic which the company has to adjust to. This has challenged companies and for their success they have had to change their usual modus operandi. In developing countries project managers are limited to the use of systems they buy from the shelf because there are no well qualified personnel in the IT and design areas. Some of the CSFs identified by Esteves and Pastor (2001) include continued managerial support and the involvement of the user. The ability to do troubleshooting is also ranked fairly high.

2.2.3 ERP System Context

Ifinedo (2006) posits that an ERP as a model combines all business facets in a single information operation and so its management is critical to organisational success. Ifinedo (2006) identied ERP system quality as a critical factor in the system context. Ifinedo noted that the system quality factor addresses how the total system will function in a manner that is easy to understand by the user, and appropriateness of the system for the tasks to be accomplished while ensuring security concerns of the ERP system are catered for.

Ifinedo (2006), opines that the ERP information quality concerns the actual information produced by the ERP system. An ERP system's main selling point is its ability to streamline the information flow in the organization and this be investigated in this study. The questions that this factor will address concerning information quality will be the adaptability of the system, its availability to the users, the reliability of the output of the system, and its usability.

2.2.4 External Expertise Context

Markus and Tanis (2000) assert that the consultants giving technical support usually develop beneficial working relationships with clients to smoothen the knowledge transfer to the receiving clients. Ifinedo (2006) posits that clients must be supported to purchase software that is not unnecessarily complicated to use so they can achieve organisational goals effectively. The consulting firms engaged must be of quality that is supported by a track record. In other words the capability of the consulting firm and the quality of total supplier support are critical factors in the success battle of each organisation.

2.2.5 ERP Success Context

Perceived benefits are the most important success measures as they capture the balance of positive and negative impacts of the system in the organization and its customers.

According to Chien and Tsaur (2007), the primary benefits expected to result from ERP system are closely related to the level of integration that is promoted across functions in an enterprise. Ifinedo (2006) noted that there exists the element of perceived benefit by the user when they are using any system purchased for enhancing operational efficiency. Improved business output resulting from operational efficiency can be measured by the impact the system has on the level of an individual or group of individuals engaged in company workflow activities of the whole organisation.

2.3. The Primary source of Critical Success Factors

This section of the chapter discusses the primary sources of CSFs as found in the literature and the dimensions of various CSFs as perceived by the various authors. Rockart and Bullen (1986) found the position where the firm operates from as well as the environment of the firm as critical to success factors. The manager of each project has a way to rank CSFs as the situation demands on the ground where he or she is operating from. Leidecker and Bruno (1984) say that potential sources of CSFs include thorough knowledge of competitors as companies and their chief executives and the terrain of their business.

2.3.1 CSF Dimensions

De Sousa (2004) posits that there are different CSF dimensions emerging from different scholars. These are discussed below:

i. Position vs the group of CSF

A CSF is placed at certain position in accordance with perceived contribution to the organisation. Thus Rockart (1979) regarded it as a position in the hierarchy of CSFs as classified in each organisation. Rockart and Bullen (1986) opine that a given industrial sector may have its own set of CSFs which will be defined as per their manifestation the

organisation. The level in the organisation is also necessary to assess any parameter as a CSF. Each organisation therefore should rank the CSFs according to the demands or needs of their organisation. This means each organisation will end up with a hierarchy of CSFs

Barat (1992) argues that the hierarchy of the CSF may also be built upon logical dependencies such as those existent between business aims and the factors influencing these aims. Amberg *et al.* (2005) noted that the hierarchical approach can be extended to include group of CSFs. They found similarities between CSFs of firms belonging to the same sector and of those managers in charge of identical functions within a company, for example, finance managers. The idea of generic CSFs for those particular groups can then be addressed. This means there is a possibility to have CSFs in a hierarchy unique to the ERP implementation for the sector generating energy for a nation (De Sousa, 2004).

ii. Short lived vs. continuous CSF

Khandelwal and Ferguson (1999) found that CSFs can be short-lived or temporary and they are some which keep on unfolding as they are continuous in nature. They cite an example of a knowledgeable project manager at the high rank within an organisation as one who can be described as an unfolding or continuous CSF. The top manager constitutes a continuous CSF as he or she influences each stage of the project during its life-time. On the contrary, the definition of the project scope represents a temporary CSF which is only regarded critical for a certain period of time. CSFs can be short-term or ongoing depending on how a project is defined. However some CSFs span periods that are longer than others. In other words the CSFs differ only in lengths of their temporal phases. (Amberg *et al.*, 2005) posit that what is important is the recognition of the varying stages of each CSF in the life cycle of a project.

iii. Internal vs. External CSF

CSFs can be classified dependent on whether they act from external or internal to the firm. According to Flynn and Arce (1997), that CSF which is within the control of management

within an organisation is said to be internal. Whereas, some CSF are said to be external to the organisation as they fall outside the control of management. When collecting data pertaining to a CSF it is prudent for one to establish the nature of the CSF and whether it is internal or external. When it is external then it must be further explored to find out what it is that influences that CSF.

iv. Constructing vs. Monitoring CSF

A CSF can be useful for the construction of a project according to the type of action taken to sustain it and it can simply be referred to as a monitoring CSF. This classification is based on the size of control the management places on the CSF (De Sousa, 2004). Flynn and Arce (1997) posit that the dimension of a monitoring CSF deals simply with monitoring yet a constructing or building dimension is involved in matters that change the organisation for future sustainable development. The CSF with construction dimension orientates the firm for future operations. Van Bullen and Rockart (1986) state that the building CSF aims at achieving a predetermined organisational change. They consider the monitoring CSF to occupy a comparatively longer period of time than the one for bringing change to an organisation.

v. Long term strategic vs. Tactical CSF

Tact has to do with negotiating a path to achieve a goal that has been derived from strategy. Thus a strategic CSF concern itself with targets that need to be achieved while the tactical dimension dwells on how to attain the targets De Sousa (2004). Targets result from long-term strategic planning done by top management in firms.

vi. Perceived vs. Actual CSF

The hierarchy of CSFs differ from one organisation to another as discussed earlier. When a manager gets a template of CSFs derived from the characteristics of another organisation they can only be regarded as perceptions because they are bound to be a new set of CSFs

for the firm as demanded by its own environment and other dynamics (De Sousa, 2004). It is prudent for management to be aware of the fact that perceived CSFs cannot be rigid for their organisation as a new dynamic set of CSFs unfolds in any new project.

2.4 Critical Success factors as found in literature

There are many factors, identified in the literature, which influence and guide ERP implementations and which have a direct impact on implementation outcomes (Rabaa'i, 2009). However, researchers have very often focused on only specific aspects of the implementation process or specific CSFs. Some investigators had set out to prepare a taxonomy of CSFs (e.g. Al-Mashari *et al.* (2003); Umble *et al.* (2003); Somers and Nelson (2004) based on literature reviews. Nah *et al.* (2001) and Somers and Nelson (2001) presented CSFs by stage of implementation. Others had been more focused on a specific area of the implementation, or had attempted to categorise CSFs according to planning frameworks (Pastor-Collado and Salgado (2000) Nah and Delgado (2006).

Table 2.1 below depicts the summary of CSFs in literature as identified by various authors. The mark X indicates the citation by the respective author. ERP Teamwork and Composition, Change Management Culture and Program, Top Management Support and Project Management has been the most frequently cited CSFs that were identified by most authors to be most important to the implementation of ERP systems. Some of the CSFs identified by the authors has been found to be unique to the projects they were surveyed (Anthony *et al.*, 1972; Rockart, 1979).

Critical Success factors	ERP Teamwork and Composition	Change Management Culture and	Top Management Support	BPR with Minimum Customization	Business Plan and Vision	Project Management	Project Champion	Communication	Monitoring and Evaluation of Performance	Software Development,	Appropriate Business and IT Legacy Systems

Authors											
Bingi, Sharma, and Godla (1999)	x	x	x	x						x	
Buckhout, Frey, and Nemec (1999	x		x		x						
Falkowski, Pedigo, Smith, and Swanson (1998)	x	x			x	x	x	x	x		
Holland, Light, and Gibson (1999)	x	x	x	x	x	x		x	x	x	x
Murray and Coffin (2001)		x	x	x		x	x		x	x	
Roberts and Barrar (1992)		x	x	x	x				x		x
Rosario (2000)	x	x		x	x	x	x	x	x	x	
Scheer and Habermann (2000)										x	
Shanks et al. (2000)	x	x	x	x	x	x					
Stefanou (1999)	x					x					
Sumner (1999)	x	x	x	x		x	x	x	x		
Wee (2000)	x	x	x	x	x	x		x		x	
Rabaa'i, Ahmad A. (2009)	x	x	x	x	x	x	x	x	x		
Samuel et al. (2013)	x	x	x	x		x		x			x
Nah et al. (2001)	x	x	x	x	x	x	x	x	x	x	x
Umble et al. (2003)	x	x	x			x			x		
Al-Mashari et al. (2003)		x	x		x	x		x	x	x	x
Nah and Delgado (2006)	x	x	x		x	x	x	x		x	
Number of citations	14	15	14	11	11	14	7	10	10	9	5

Table 2. 1: Summary of CSFs in literature

In order manage the CSFs it is crucial that a firm identifies those factors that it can assess to be implementable while maximising the benefits of these factors by addressing them with available expertise. Some of the factors identified by the various authors have been found to be unique to the projects that they surveyed. The identified CSFs were viewed by the respondents as applicable to research studies of projects in various contexts. The Thus managers should not accept CSFs wholesomely without understanding the contexts within which they were identified and the context into which they are going to be implemented.

Without such scrutiny, a project can fail because of CSFs that are not appropriate in terms of context. Boon *et al.* (2004) criticised the method for providing a long list of CSFs. However various researchers have presented the CSFs in a variety of formats to facilitate the conceptualisation of findings. For example a case hierarch Zahedi (1987), prioritisation of CSFs Somers and Nelson (2001), and categorisation of schemes (Alazmi and Zairi, 2003).

Various procedures can be used to identify relevant CSFs (De Sousa, 2004). These include focus group discussions, case studies and structured interviews

Research Method	**Authors**
Action research	Jenkins et al. (1999)
Case studies	Walsham (1995); Sumner (1999); Gibson et al. (1999), Shanks (2000); Brown and Vessey (2003); Brockhoff, 2003) Bizan, (2003); Cooke-Davies, (2002); Balachandra and Raelin, (1984); Rockart, (1982)
Interviews	Mahmood et al., (2014); Shah and Siddiqui, (2006) Shank et al., (1985); Bullen and Rockart, (1981) Munro and Wheeler, (1980); Rockart, (1979)
Combination of Methods	Khodaveysi et al., (2016) Barragán-Ocaña and Zubieta-García, (2013) Yamazaki et al., (2012) Kulatunga et al., (2009; 2011) Belassi and Tukel, (1996)

	Pinto and Slevin, (1989) Leidecker and Bruno, (1984)
Analytic Hierarchy Process (AHP)	Chua et al., (1999)
Questionnaire	Somers and Nelson (2004); Maditinos *et al.* (2011); (Baccarini & Collins, (2003) Ika et al., (2012); Lee and Park, (2006); Martin, (1982) ; Somers and Nelson (2004)
Statistical method involving the Chi-Square	Hyvari, (2006)
Delphi technique	Atthirawong and McCarthy (2001), Brancheau et al. (1996)
Focus group discussion	Khandewal and Miller (1992)
Review of projects literature	Pastor-Collado and Salgado (2000); Nah *et al.* (2001); Umble *et al.* (2003);Nah *et al.* (2003); Nah and Delgado (2006);
Mathematical method involving multivariate analyses	Dvir et al. (1996);
Observation and scenario analysis	Barat (1992);
Stratified interview	Van Bullen and Rockart (1986)

Table 2. 2: Research methods used for CSF identification

Table 2.2 provides list of the frequently used methods. These have been used in various contexts. Samuel *et al.* (2013) used a combination of methods in an attempt to identify the critical CSFs that influenced the Ethiopian ERP implementation process. He came up with 17 CSFs which were found to be critical. Some of these CSFs are the training of those who

use systems, well-articulated goals, employing expert consultants and accurate re-engineering.

Maditinos *et al.* (2011) used the questionnaire method to investigate the way human inputs (top management, users, external consultant) are liked to communication effectiveness, conflict resolution and knowledge transfer in the ERP consulting process as well as the effect of these factors on ERP system effective implementation. Maditinos *et al.* (2011) found that the assistance provided by external consultants during the implementation process is essential and knowledge transfer is an extremely significant factor for ERP system success. Knowledge transfer concerning aspects of ERP system was found to be more important significant than effective handling of communication and conflict resolution among organisational members. Top management support was found to be of less importance than the one provided by users (Maditinos *et al.*, 2011).

A study conducted in Lithuania by Pabedinskaitė (2010) drew participants from specialist with extensive experience in the implementation of ERP and users from organisations which had implemented or were implementing ERP Systems and he compiled the following list displayed in Table 2.3.

Factors under analysis	**Evaluation by experts**	**No according experts**	**Evaluation by users**	**No according users**
Clear and measurable goals of the project	4.39	1	4	5
Thorough analysis of the organisation's needs and vision	4.00	2	3.94	3
Competent management of the project	3.98	3	3.31	7
Control of implementation of the project's time budget and tasks	3.88	4	4.31	1

Competent team of the project	3.88	5	3.38	2
Thorough and competent planning of the project	3.80	6	4.19	9
Competent external consultants (the supplier)	3.66	7	3.63	10
Management of organisational changes	3.59	8	3.80	8
Support by top management	3.49	9	3.88	14
Close co-operation with the external supplier of the system	2.34	10	3.75	11
Well-organised transfer of data	3.29	11	3.44	12
Reorganisation of business processes	3.27	12	3.44	16
Appropriate and timely training of employees	2.90	13	3.25	6
Optimal balance between the business and technological part of the project	2.85	14	3.47	4
Involvement of employees in the project	2.78	15	3.19	13
Open and continuous communication within the organisation	2.68	16	3.44	15
Average evaluation:	**3.481**		**3,676**	
Variation	**0.210**		**0,135**	

Table 2. 3: Results of experts' and users' evaluation

(Source: (Pabedinskaitė, 2010)

Pabedinskaitė (2010) found a statistically significant correlation between what the experts listed and what the users compiled as CSFs. He found some vital factors that are internal to an organisation which are logically derived goals, support of the directors and relevant training of personnel involved in the implementation phases. He also found free communication between managers and subordinates as essential. He found that the CSFs given by experts for monitoring ERP were substantially different from the order of factors given by the users regarding internal factors. The users regarded the way the implementation of ERP was carried out as most crucial of factors and this was enhanced by clear goals that were easy to understand.

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A study of literature by Nah and Delgado (2006) found the order of CSFs which fell into seven categories. Among the categories listed are business plan and vision, management of change, teamwork, communication and support by the senior management. Verville *et al.* (2005) found ten CSFs which include evaluation framework and user acceptance. The factors are: a planned and structured process, rigorous process, definition of all requirements, establishment of selection and evaluation criteria, accurate information, clear and unambiguous authority, and careful selection of the acquisition team members, partnership approach, user participation, and user buy-in (Verville *et al.*, 2005).

Eighty six firms were investigated by Somers and Nelson (2004) to identify CSFs. Amongst the 22 CSFs they listed included support by directors, clear goals and competence of the members in the project management team.

The study by Al-Mashari *et al.* (2003) came up with twelve CSFs which they placed in three categories which are associated with ERP implementation. The three categories are starting-up, team deployment and evaluation of each step undertaken and regular evaluation. The CSFs include testing of the system in the processes and robust project evaluation. They rated leadership commitment as most critical. Brown and Vessey (2003) also found an involved top management as the backbone to ERP implementations alongside clear planning. One factor they isolated was a mind-set that was goal orientated. Umble, Haft and Umble (2003) amongst their CSFs were data accuracy. Implementation can never

be successful if it is based on inaccurate data. This means the team involved in ERP implementation must be supplied with reliable data from each source they are supposed to depend upon. There are multi-sites involved in ERP implementation and these must generate accurate data. Such data are dependent on education and training, another CSF they identified.

Nah *et al.* (2003) conducted a study from literature review aimed at isolating CSFs that are essential for success in ERP implementation. They found 11 factors which they classified as critical to successful ERP implementation. These include ERP teamwork and composition; change management program and culture; top management support; business plan and vision; business process reengineering with minimum customization; project management; monitoring and evaluation of performance; effective communication; software development, testing and troubleshooting; project champion; appropriate business and IT legacy systems. Nah *et al.* (2001) further classified these factors into the respective ERP implementation phases (chartering, project, shakedown, onward and upward) in Markus and Tanis' ERP lifecycle model. Nah *et al.* (2001) suggested Teamwork and composition in the ERP implementer-vendor-consultant partnership to be a key factor influencing ERP implementation success. Also good coordination and communication between the implementation partners were noted as essential. In a later study Nah *et al.* (2003) used a survey to identify the degree of criticality of each factor Chief Information Officers (CIOs). The 5 most critical factors identified by the CIOs were top management support, project champion, ERP teamwork and composition, project management, and change management program and culture (Nah *et al.*, 2003).

Two studies carried out in China and Australia by Shanks (2000) identified eleven CSFs which included external expertise and employing the most suitable people on a full time basis for project implementation. Between the two studies the CSFs that were found to be common are the support of senior management and the assembling of balanced teams for project implementation. Parr *et al.* (1999) added a balance between business and technical skills as critical success factors in ERP implementation after conducting interviews with

ten different project management experts who between them had undertaken twenty four ERP implementations.

Wijaya *et al.* (2017) in review of literature identified the most important key success factors in the implementation of ERP systems as Management support and commitment, Business Process engineering, ERP performance, User training and education, Integrating. These factors have a main impact in ERP systems success. Bintoro *et al.* (2015); Leyh *et al.* (2017) and Hentschel *et al.* (2019) noted the CSFs domain for ERP systems as top management support and involvement, project team competence, and interdepartmental co-operation, change management, business process re-engineering, project management, user training.

2.5 Identification processes for CSFs

Kumar (2019) opines that the manner of CSF identification utilises given set of technical tools in the ERP studies. This includes finding answers to questions that hitherto have remained without answers. The methodology of the investigation is vital to producing the desired goals in identifying the CSFs. According to Bento 2013 a significant o ERP systems has focused of the identification of Critical Success Factors (CSFs). Bintoro *et al.* (2015) argued that ERP implementation success is a compilation and analysis of CSFs.

2.5.1 Interviews and group discussions

Interviews are a popular and important research method. This tool is the dominant data collection strategy for qualitative inquiry (Merriam and Tisdell, 2016). In research conducted with a subjectivist epistemology, interviews are often considered to be gold standard (Barbour, 2008). Interviews method themselves can take different form depending on their use ranging from highly structured, to semi structured to very loosely formatted (Merriam and Tisdell, 2016). The use of structured interviews has become widely used. This technique allows respondents to use the two categories of yes and no in most cases without allowing much freedom to the participants (Lune and Berg, 2016). The other

technique used involves open-ended questions in the interview which allow flexibility for the interviewee to expand on certain issues as he or she is engaged by the interviewer (Gubrium and Holstein, 2002; Alshenqeeti, 2014).

Powell *et al.* (1996) define a focus group as a group of individuals selected and assembled by researchers to discuss and comment on, from personal experience, the topic that is the subject of the research. The main purpose of focus group research is to draw upon respondents' attitudes, feelings, beliefs, experiences and reactions in a way in which would not be feasible using other methods, for example observation, one-to-one interviewing, or questionnaire surveys.

Brown (2001) has found interviews achieve more answers which are usually complete in explaining the concept under study even though they consume considerable amounts of time. The flexibility in the interaction during the interview is advantageous although some respondents who may wish to remain anonymous are reluctant to participate.

In conclusion, with regard to the advantages and disadvantages of interviews and to make my position clear, I would follow who maintain that although interviewing is a powerful way of getting insights into interviewee's perceptions, it can go hand in hand with other methods "providing in-depth information about participants' inner values and beliefs" (Ho, 2006).

2.5.2 The questionnaire approach

A questionnaire is a research instrument consisting of a series of questions (or other types of prompts) for the purpose of gathering information from respondent. The use of questionnaire is well established with the benefits and drawbacks of using such a method (Giuffre, 1997; Keeney *et al.*, 2006). Questionnaires are accepted as having certain advantages over other data collection methods such as interviews (Denscombe, 2003; Bowling, 2014).Considering the fact that the survey questionnaire approach has been

selected as the primary data collection instrument, it is imperative to note that this approach has specific attributes that should be kept in mind. The research questionnaire survey approach requires an extensive degree of reliability on the development of the questionnaire (Gubrium and Holstein, 2002). A seemingly minor error in the phrasing of a question or the formulation of an answer can render the findings of the survey questionnaire useless and can jeopardize the entire study. Unintended bias on the part of the researcher during the development of the survey questionnaire or on the part of the respondent during the answering of the survey questionnaire may also serve to alter the research findings.

Advantages

- Mainly low data collection and processing
- Minimum training is required by the person administering
- They can reach much larger number of a target population than would be possible using interviews.
- Can be delivered in a variety of ways, such as verbally, by telephone, electronically as attachments or as web links

Disadvantages

- Low response rate and associated bias
- Those who do respond may not be typical of the subject group
- There will be little or no contact between the researcher and the participants which may also adversely affect response rate.
-

2.5.3 The Case Study

The case study research involves the study of an issue explored through one or more cases within a bounded system for example a setting or a context (Creswell and Creswell, 2017). Although Merriam (1988); Denzin and Lincoln (2008) and Yin (2011) viewed a case study as a strategy of study, a methodology or comprehensive study Stake (1995) viewed it as a choice of what is to be studied.

There are numerous advantages in using the case study. Yin (2011) noted the following:

- The examination of data within the context of its use and enable the researcher to examine data at a micro level.
- The variation in terms of intrinsic, instrumental and collective approaches allow for both qualitative and quantitative data to be analysed.
- The detailed qualitative case studies are capable of providing real situations experienced in the lives of participants.
- Provide better insight into the detailed behaviours of the subjects of interest.

Disadvantages as follows;

- Lack of rigour
- Provide little basis for scientific generalisation, since they use smaller numbers of subjects.
- Too long, difficult to conduct and provide a massive amount of documentation
- The tendency for a researcher to have a biased interpretation of the data.

Based on the literature review Pinto and Slevin (1989); Baccarini and Collins (2003); Nah *et al.* (2003); Pabedinskaitė (2010); Maditinos *et al.* (2011) used questionnaires and survey to achieve their research studies in various environments. Shanks (2000); Brown and Vessey (2003); Umble *et al.* (2003) used case studies to conduct research in various settings and contexts. Parr *et al.* (1999) based on interviews with expects to identify CSFs for successful implementation of ERP with the analysis and coordination of the views of the participants were left to the researcher.

In acknowledging the complexity of the ERP system implementation projects this paper uses an interpretive interview approach for the identification of CSF of ERP system implementation in Zimbabwe energy sector.

2.6 Chapter summary

The chapter has discussed the conceptual and theoretical framework as related to CSFs in various sectors. Literature has revealed factors which are necessary for successful ERP implementation. The chapter also discussed commonly adopted approaches used in the identification of CSFs. The following chapter will discuss the research methodology utilised in the study.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

This chapter will discuss the philosophical assumptions and the design strategies underpinning this research study, the research methodology and design. This chapter outlines the methodology that will be used in conducting the research. The chapter presents the research design, target population and sampling techniques that were employed. It will further identified the data collection instruments that will employed and conclude by discussing how data analysis will conducted. Measures undertaken to achieve reliability and validity are discussed. Ethical issues also come up in this chapter.

3.2 Research Philosophy

Research is based on some underlying philosophical assumptions about what constitutes a valid research and which methods could be most suitable for acquisition of the desired knowledge (Morgan *et al.*, 2006). The study subscribed to interpretivism as it endeavoured to grasp views and different interpretations of events as proffered by participants. Yon (2015) says that interpretivism is capable of unveiling contemporary complex life occurrences. Carr and Kemmis (1986) define a research paradigm as an inclusive system of intimately related practices and thought process which give meaning to the type of enquiry. Carr and Kemmis (1986) identified the commonly adopted major dimensions of research process as ontology, epistemology and methodology.

Ontology and epistemology involve the word views of participants and in interpretivism it is the right afforded the participants to explain how they view and interact with their day to day experiences (Wahyuni, 2012). In the interpretivist paradigm the researcher is not superior to those he interacts with or outside but is an compiler of experiences as narrated by participants and classifies these using the skills resident in the researcher (Carr and Kemmis, 1986). The researcher found this paradigm as appropriate for this study.

3.3 Research methodology

Myers (2019) defined a research method as strategy of enquiry and a way of finding empirical data about the world. Wahyuni (2012) opines methodology is the way a study process will unfold itself within a given paradigm. Merriam (1988) considers the researcher as the main instrument used in the collection of data.

3.4 Research design

Bhattacherjee (2012) defines research design as a process of creating activities that unlock answers to the research questions which include choosing a research method and formulating an appropriate sampling strategy. Isaac and Michael (1981) found a design a way of tackling a research problem. Bogdan and Taylor (1975) opine research design as the entire process of research from conceptualizing a problem to writing research questions, and on to data collection, analysis, interpretation, and report writing.

The study utilised the case study research design. A case study facilitates a deep investigation of a real-life contemporary phenomenon in its natural context is a case study (Woodside, 2010). It can provide data emanating from a number of sources so that the events are understood from different perspectives yet in the same context (Baxter and Jack, 2008; Ritchie *et al.*, 2013).

Yin (2009) posited that the unit of analysis in a case study research can be concrete (e.g. individual, organisations) or more abstract (e.g. relationships, decisions). The unit of analysis in this study fall in the concrete category as the researcher looks at the continuous process of ERP implementation in context in REA.

3.5 The case: Rural Electrification Agency (REA)

The organisation under study felt the need to get its business processes automated for its operational efficiency and effectiveness. The business processes were running manual and the flow of information generated were very slow and the collection of the information in-time problematic. In order to overcome the problem the management decided to get its processes automated through implementation of ERP. The focus of the case study will be to identify the CSFs in the implementation of ERP in REA. REA has been involved in the implementation of ERP for a period of more than four years. The installation of the software, customisation, implementation and system champions training were conducted by the software vendor team. Walsham (1992); Koh *et al.* (2000) and Lorenzo (2001) as cited by Staehr *et al.* (2012) espoused the points which justify the selection of case study as availability of valuable data, narrative of ICT experiences and organisation size which the researcher also identified in REA.

- **Valuable data:** ERP implementers in REA are capable of providing from their experiences informative insights as regards ERP implementation. Their ideas are subjective as their interpretation of events is as per their perceptions.

- **Narrative of ICT experiences:** The participants are in a position to narrate their experiences within the organisational settings their world view.

- **Organisation size:** REA is spread across the entire Zimbabwe covering diverse cultural and operational modalities. The choice of REA by the researcher was justified as the biggest operator and would be representative of the electricity energy sector in Zimbabwe.

3.5.1 Population of study

The population of a study is the entire group of persons or set of objects and events from which the researcher is interested in gaining information and drawing conclusions about.

Polit and Hungler (1998) refer to the population as an aggregate or totality of all the objects, subjects or members that conform to a set of specifications. REA as an organisation might have a large number of employees, but not all has roles in SAP system in their discharge of their duties. The researcher decided to concentrate on those that interfaces with SAP. The population target are those with roles that entails the usage of SAP. These include the end users, project team, module owners and management.

3.5.2 Sampling and Sample

The researcher will undertake a purposeful sampling so as to garner facts from project managers of their assignees because the desired population for the study is rare or very difficult to locate and recruit. The purposive sampling target a particular group of people. The researcher handpicked the respondents to be included in the sample on the basis of his judgement of their typicality or possession of particular characteristics being sought.

Purposive sampling means that the researcher is looking for participants who possess certain traits or qualities (Koerber and McMichael, 2008).In this study participants will be chosen from personnel who had intimate knowledge on project management phases. Strydom *et al.* (2005) posit that purposive sampling is based completely on the judgement of the researcher since the sample is composed of those elements which contain the most characteristics and knowledge of the population. Cohen *et al.* (2013) consider the factors critical to a sample as its size, and how spread it is throughout the population, accessibility of the sample and the assembling strategy for the sample. According to Field (2005) a sample is a smaller collection of units from a population used to determine truths about that population. Gentles *et al.* (2015) opine that the size of the sample must be big enough that the researcher should be able to get all viewpoints. Whereas, quantitative research requires sufficient large samples sizes to produce statistically precise quantitative estimates, smaller sample sizes are used in qualitative research (Gentles *et al.*, 2015). This is because the aim of qualitative research is to acquire information that is useful for the understanding of the complexity, depth, variation or context surrounding a phenomenon. The commonly used

criterion for determining when sufficient sample size has been reached in qualitative research is data saturation(Lincoln and Guba, 1985; Charmaz, 2014; Merriam and Tisdell, 2016). Saturation refers to reach a point of informational redundancy where additional data collection contributes little or nothing new to the study (Charmaz, 2014). This can be problematic given the researchers' tendency's to arbitrarily claim saturation in justification of premature closure of the data collection activities (Charmaz, 2014). The researcher will up the intensity of the contact needed to gather sufficient data regarding the phenomenon or experience of the participant by taking more than enough time with the participant.
Participants in the study were classified as follows:

- **Work experience:** Work experience influences the success of any project implementation (Shah *et al.* (2011).

- **Position occupied**: This provides insight into how the position occupied influences the ERP implementation.

- Job description of participants: The roles played by implementers must be balanced equitably so that their varied experiences and skills may be fully complimentary.

3.6 Data Collection

Data was collected through questionnaires and interviews. A questionnaire is the research instrument consisting of a series of question and other prompts for the purpose of gathering information from respondents (Mellenbergh, 2008). The questionnaire was administered first then followed by interviews meant to further clarify and probe certain pointers emerging from the data. The questionnaires contained closed questions for demographic purposes and open ended questions for further elaboration by the respondents according to their experiences. Face to face interviews were conducted were it was feasible under Covid-19 precautions.

The main purpose of the questionnaire was to get opinions of the participants of the CSFs necessary for the successful implementation of ERP in REA. A cover letter, in order to explain the questionnaire in details along with a request to participate will be presented. A sample of the questionnaire with interview guide is available in Appendix D.

To ensure that nothing will be missed, the researcher will seek permission to record or/ and take notes with a pen and paper. The method will be chosen in place of focus groups because the potential participants may not be included or comfortable in talking in a group or when the researcher want to distinguish between individual about the program. As much as Tuan (2004) alluded to the fact that a group of people's varieties are greater than individual's due to the fact that each person captures a complex situation, Patton (2002) is of the view that individual views can provide a flexible and method that contextualise user's perspective and experiences.

3.7 Data Analysis/ presentation and Interpretation

Bloomberg and Volpe (2008) state that qualitative research begins with questions and to inform the questions the researcher collects data. The thematic analysis method was used to analyse the data. Braun and Clarke (2006) posit that thematic analysis is a method for identifying, analysing and reporting patterns within data. The objectives dictated the themes that were analysed. Interpretation coupled with discussion was executed as data was outlaid so that they could be contextually grasped. In instances where possible, tables and charts are used to enhance the relevance of the results.

3.7.1 Computer Use in Qualitative Data Analysis

Maxwell (2012) presents a useful strategy for qualitative data analysis, details of which are covered in this section. He argues that the initial step in qualitative analysis is "reading the interview transcripts, observational notes" and any other documents relevant to the study. The transcription process itself can be used for initial analysis, with the analyst recording

notes or memos while transcribing. These initial notes can be used to formulate categories and themes, and help to begin to think about relationships between them.

NVivo software will be used to derive the critical success factors from the interview transcripts. By using the NVivo software, the interview transcripts will be scrutinised to identify the main concepts regarding the critical success factors of ERP implementation. The main concepts generated from the interview transcripts will be assigned an appropriate code to represent the success factor. Bazeley and Jackson (2013) noted that using a computer in the analysis of qualitative ensures that the user is working more methodically, more thoroughly and more attentively. Bazeley and Jackson (2013) identified a number of advantages for using NVivo and alluded that the analysis becomes easier and produce more professional results. NVivo reduces a great number of manual tasks and give the researcher more time to discover tendencies, recognise themes and derive conclusion. This software has an advantage in managing data and ideas, querying data, modelling visually and reporting.

It helps to maximise efficiency and speed up the process of grouping data according to categories and retrieving coded themes. Ultimately, the researcher still has to synthesise the data and interpret the meanings that were extracted from the data. Therefore, the use of computers in qualitative analysis merely made organisation, reduction and storage of data more efficient and manageable. This researcher will pursue the procedures of this software in order to ease the muddled, vague and time-consuming task. The qualitative data analysis process is illustrated in Figure 3.1: Qualitative data analysis flowchart.

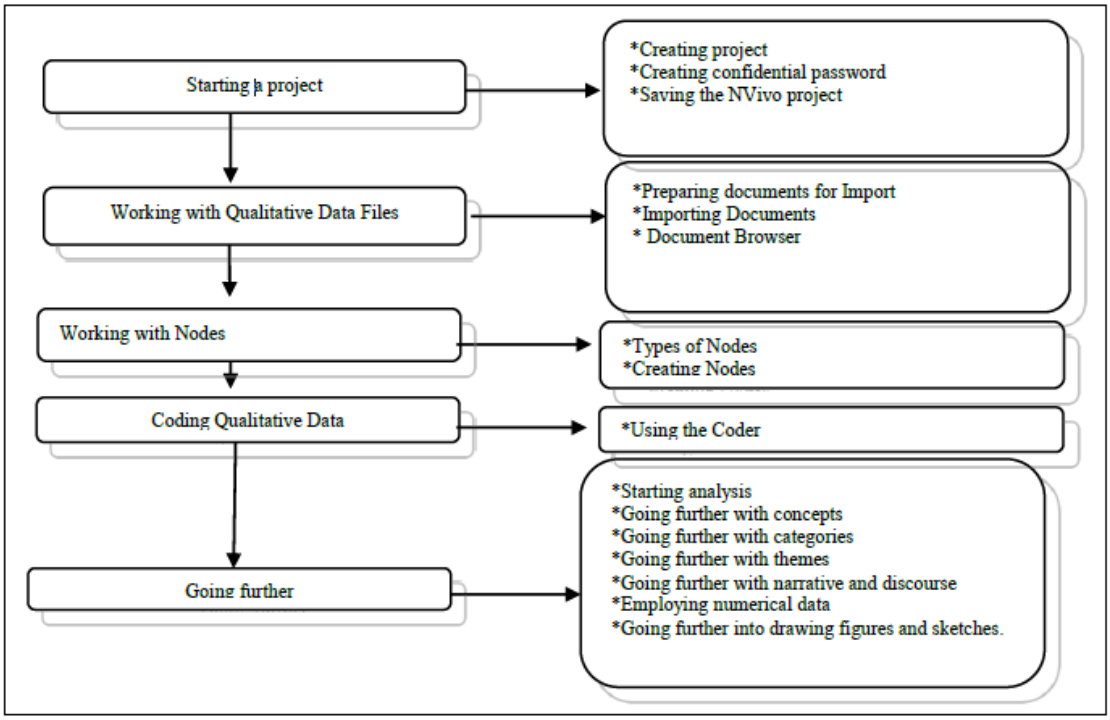

Figure 3. 1: Qualitative data analysis flowchart

(Source: Wong, 2008)

Bazeley and Jackson (2013) identified five tasks in which NVivo ease the analysis of qualitative data. These include managing data, managing ideas, querying data, modelling visually and reporting. Managing data involves the organising of a number of muddled data documents that include interview transcript, notes of observations and published documents, while idea managing is carried out in order to understand the conceptual and theoretical issues generated in the course of the study. Querying data will be through posing several questions of the data, and utilising the software in answering the queries. The results of the queries will be saved to allow for further interrogation. So querying and searching become part of an ongoing enquiry process. Modelling visually will be done through creating graphs and demonstrate the relationships between the conceptual and theoretical data. By utilising the data collected and the results found, reports transcript are formulated about the study conducted.

3.8 Trustworthiness

Sandelowski (1993) posits that trustworthiness is basically a question of persuasion by which the researcher is viewed to have made the research procedure to be visible and auditable. According to Guba (1981) trustworthiness is an antecedent that attests to the quality of research design. Lincoln and Guba (1985) suggested credibility, transferability, consistency/dependability and confirmability as dimensions of establishing trustworthiness in qualitative research.

3.8.1 Credibility

Rolfe (2006), states that the credibility task is to ensure the results obtained are believable to the consumers of the study report. In order to ascertain credibility, Lincoln and Guba (1985) suggested that the researcher must obtain feedback about how he has interpreted the data he has obtained from those who participated in the study. Accordingly, the researcher will solicit for feedback on the preliminary and emerging findings from some of the people interviewed. This is to find out whether the interpretation rings true and identify the researcher biases, misunderstanding of what was observed.Lincoln and Guba (1985) also suggested adequate engagement in the data collection. The researcher will spent adequate time on collecting data such that the data become saturated. The data and emerging findings must feel saturated, that is when one begin to see or hear the same thing over and over again.

3.8.2 Transferability

Transferability is when the findings in a study could be utilised in similar conditions besides the study that has generated the current findings (Krefting, 1991; Davies and Dodd, 2002). For this to happen Shenton (2004) says it is vitally important to describe sufficiently the environment and conditions under which the study is being undertaken. This will enable comparisons if the same phenomenon is being studied in a different context. Delimitations

of the study must be clarified for easy understanding (Davies and Dodd (2002). Reader or user generalisation involves leaving the extent to which a study's findings apply to other situations up to the people in the situation (Merriam and Tisdell, 2015). Seale (1999) suggests that the environmental setting of the study must be fully described so that users of the findings can make judgment about the transferability of the study.

3.8.3 Dependability and Confirmability

Dependability in qualitative study is the equivalent of reliability in quantitative studies Lincoln and Guba (1985); Shenton (2004) and confirmability is the extent to which others can vouch for the results in the study. Traceability of the path traversed by the researcher from data collection, participants and analysis methods enhance dependability of a study (Seale (1999). The researcher managed to provide details of the steps undertaken in the study for consumers to peruse and confirm.

3.9 Ethical Considerations

This research involved human participation, therefore UCT research committee ensured that the principles of voluntary participation, harmlessness, anonymity, confidentiality, and so forth are preserved, and that the risks posed to humanity will be minimal (Bhattacherjee (2012). The researcher completed the application form for ethics in research projects, and submitted to the Faculty of Engineering and Built Environment for approval. The research questionnaires and research proposal were submitted to the Faculty Engineering and Built Environment as well. The Chief Executive officer granted permission for data collection. The research questionnaire was designed in such a way that all REA participants were given detailed information about the purpose of the study, the name of the researcher and the beneficiaries of the study. The participants received a consent form that explained their right not to participate, and right to withdraw before their response in the research study. The researcher made sure that the participants were not emotionally or physically during and after the conduct of the research

3.10 Chapter summary

The chapter has provided the research philosophy and design. Sampling technique was discussed, data collection and the parameters of reliability, validity and trustworthiness amongst other essentials. Ethical considerations have been discussed as well. The next chapter presents and analyses the results accompanied by discussion.

CHAPTER 4: RESEARCH FINDINGS AND DISCUSSION

4.1 Introduction

This chapter will present and analyse the collected data. Based on the selected qualitative research design as discussed in Chapter 3, the participants' interviews were audio recorded and transcribed for analysis in NVivo 12 qualitative analysis software. Discussions were done alongside the analysis to enhance contextual understanding of the results. The researcher employed thematic analysis Braun and Clarke (2006) and guided by the research objectives.

4.2 Research Participants

A total of 18 participants took part in the search study. The number was arrived at after data saturation Charmaz (2014), as discussed in chapter 3 was reached as no new information could be obtained from the participants. The demographic data of respondents in terms of occupation and cumulative years of experience are given in Table 4.1.

OCCUPATION OF RESPONDENTS	ASSIGNED CODE	NUMBER OF RESPONDENTS	COMBINED YEARS OF EXPERIENCE
Project engineer	SP01; SP02; SP03; SP10; SP14; SP16	6	34
Provincial manager	SP04; SP06	2	10
Senior engineer	SP07	1	5
Stores clerk	SP08; SP11	2	4
Accountant	SP05; SP18	2	12
Internal auditor	SP12	1	6

Human resources	SP09; SP15	2	6
IT Administrator	SP13	1	5
Receptionist	SP17	1	3
TOTAL		**18**	**85**

Table 4. 1: Demographic data of respondents

The Table 4.1 shows that 6 project engineers participated in the study and these comprised the largest component of respondents. Two (2) provincial managers participated and these represented the highest level of administrative authority among the participants. The cumulative number of years of experience of the participants in the implementation of the ERP project totalled 85 years. The implementing team comprised the project manager, module owners, key users and users have been involved in the implementation for periods ranging from 3 – 7 years. This was regarded by the researcher as a rich and sufficient source of data for the research study. This huge collective number of years added to the validity of the data obtained. Bashir *et al.* (2008) opine that experiences related to the focus of the study are a function of the number of people and the quantum of their pooled experiences about what is being investigated. Thus the more the number of years the more likely the researcher comes across sufficient data. McMillan and Schumacher (2006) stated that validity refers to the degree of congruence between the explanations of the phenomena and the realities of the world and this study utilised the explanations from varied responses coming from different levels of responsibilities assigned in the workplace. In qualitative research validity has to do with description and explanation, and whether or not the given explanation fits a given description (Kvale, 2006). Thus the multiplicity of available explanations was regarded as proof enough for the data proffered to be qualitatively valid. The research participants possessed experiences ranging from 3 to 7 years in the implementation of SAP system in the organisation as shown in Figure 4.1 below. Figure 4.1 shows the percentage of the number of years of experience in the implementation of SAP. Figure 4.1 show that 39% of the participants had 5 years of experience in the implementation of the project. The higher percentage means that participants from the

various project implementation roles had considerable knowledge on the implementation process.

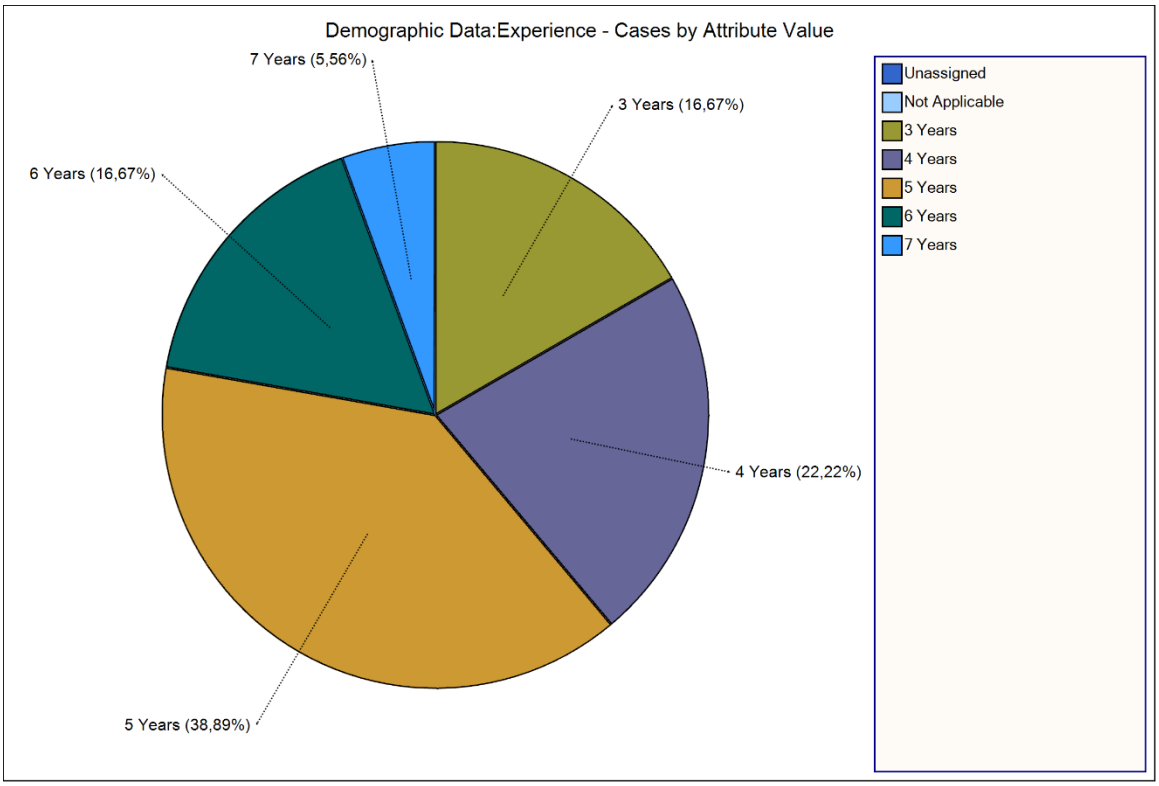

Figure 4. 1: Experience of Participants in ERP Implementation

As indicated in Figure 4.1, 16% of the participants have 3 years of experience in the implementation of SAP, 22% have 4 years, 17% have 6 years and 6% had 7years of experience in the implementation of SAP.

The participants occupied different professional occupations within the organisation. The distribution of professions amongst the participants is illustrated in Figure 4.2 below:

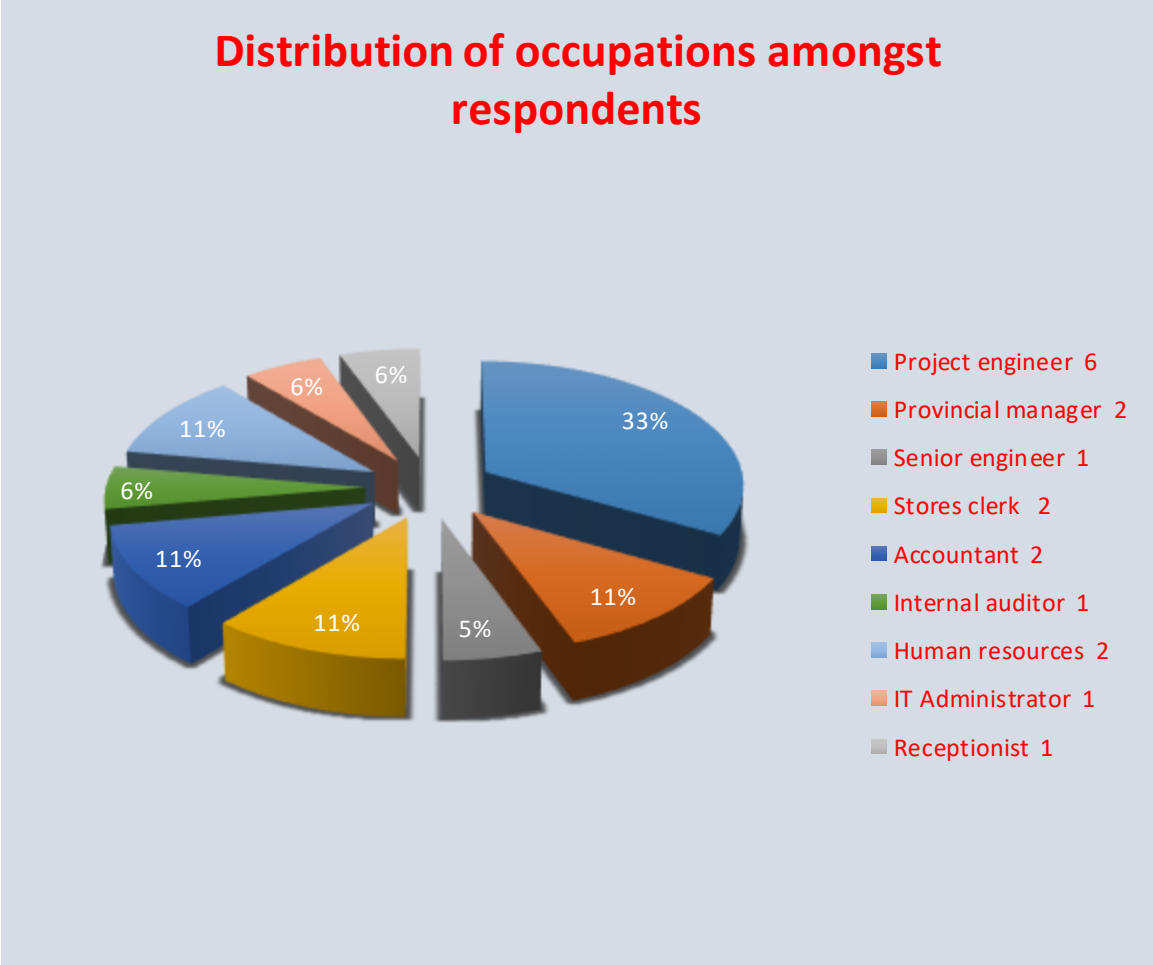

Figure 4. 2: Distribution of occupations amongst respondents

According to Figure 4.1, 33 % of the participants were Projects engineers as they constituted the highest number of officers in the organisation. The other participants were made up of Provincial managers (11%), Stores clerks (11%), Senior Engineer (6%), Accountant (11%), Receptionist (6%), Internal Auditor (6%), Human Resources (11%), and IT Administrator (6%). The array of participants from various positions in the project under study gave a continuum of perspectives that may be different but concerning the same project (Shah *et al.*, 2011). Strydom *et al.* (2005) opine that the sample should be composed of those elements which contain the most characteristics and knowledge of the population. This provided a wide range of perspectives and yet an opportunity to understand the project critical success factors from the various individuals engaged in the project.

The participants were further classified according to their official responsibilities in the SAP implementation project. The categories comprised of end users, super users, module owners and project managers as shown in Figure 4.3. The project manager is the one responsible for ascertaining that the objectives of the ERP implementation project are achieved within the set time, budget and defined quality. The module owners are the individual team leaders of a particular module and the key users are those were well-versed in the new system‘s technical features and know how to leverage the software to perform complex task and to train other end users. End users are those that use the system on their line of duty.

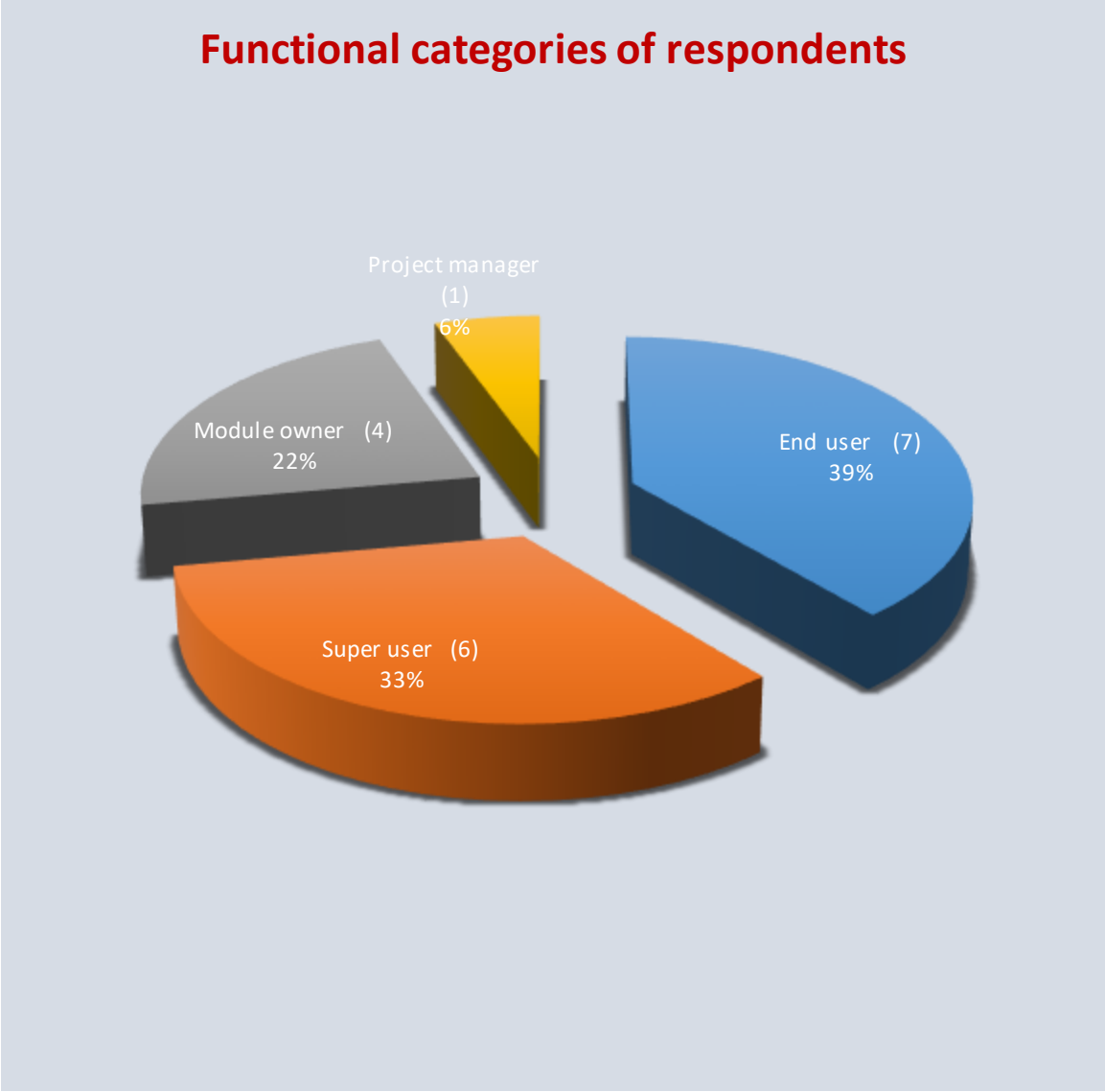

Figure 4. 3: Functional categories of respondents

The majority of the participants (39 %) were experienced end users with a period exceeding three years working on the SAP implementation project. Twenty two percent (22 %) of the participants were module owners of the SAP implementation project, (33 %) of the participants are super (key) users and 6 % represents the project manager of the SAP implementing team. In this regard Cohen *et al.* (2013) stressed the need for the representativeness of the sample.

4.3 Data Collection and analysis

Data was collected through in-depth interviewing of the participants. The interviews contained closed question for demographic data purposes. The interviews were audio recorded and then transcribed orthographically and reproduced all spoken words into retrievable form. The interviews were done with such intensity to the extent that additional data collected contributed little or nothing new information to the study. The researcher used this as a guide or indicator that sufficient data has been achieved (Charmaz, 2014).

A total of ten (10) (56%) face to face interviews done around the various regions. Eight (8) 44% interviews were conducted telephonically as they cannot be accessed through face to face due to the prevailing Global Covid -19 pandemic experienced the time of the study. Figure 4.4: below show the diagrammatic representation of the mode used to conduct the interviews.

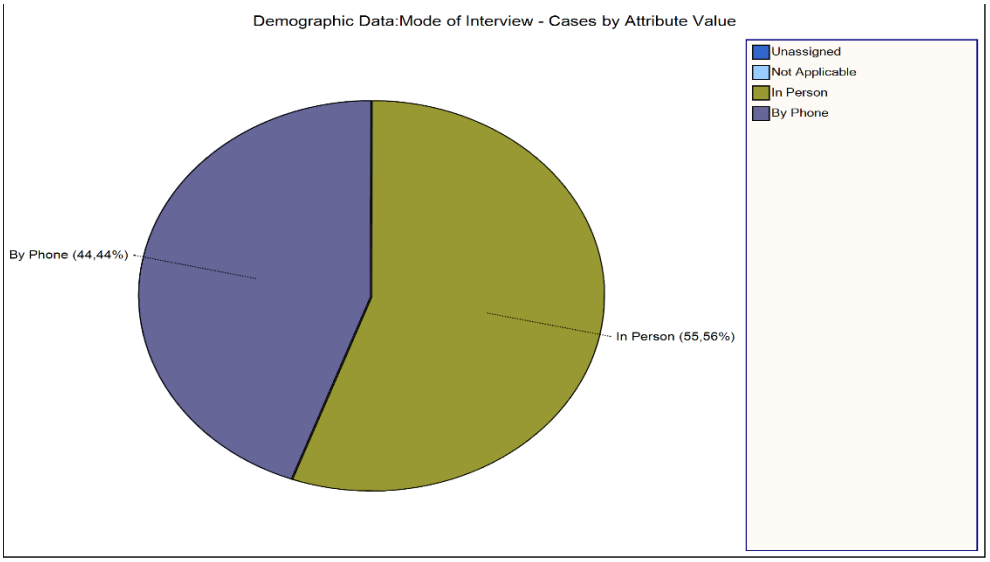

Figure 4. 4: Mode of Interview

The daunting task of transcription preceded the interviews. The transcription was made more strenuous as some of the participants expressed some phrases in their vernacular languages as they try to hammer a point. Playing back the recorded data for recalling information helped the researcher to recognise main points of the data. The poor quality of

audio from the telephonically conducted interviews needed more time and concentration to transcribe as the audio has to be replayed several times in order not to miss any important information.

According to Braun and Clarke (2012),thematic analysis is a method for systematically identifying, organising and offering insight in to patterns of meaning (themes) across the data set. This researcher adopted the thematic analysis method as discussed in chapter 3 and used Nvivo 12 qualitative analysis software as a way of identifying what is common to the way a topic is talked about and making sense of those commonalities. The researcher began the systematic analysis of the data through the process of coding. Coding is a way of thinking data. So, organisationally coding is a useful way of keeping track of topics and ideas about the topic (Braun and Clarke, 2012). The codes are the building blocks of analysis as they provide a pithy summary of a portion of data and an interpretation about the data content. Creating a node/theme and selecting a text for coding were an interpretive analytic process in the thinking of data. The nodes/theme were developed as the researcher was going through analysing the interviews. Figure 4.5 shows the nodes/themes that were identified from the data analysis. The node represents the Critical Success Factors that were drawn from the data analysis.

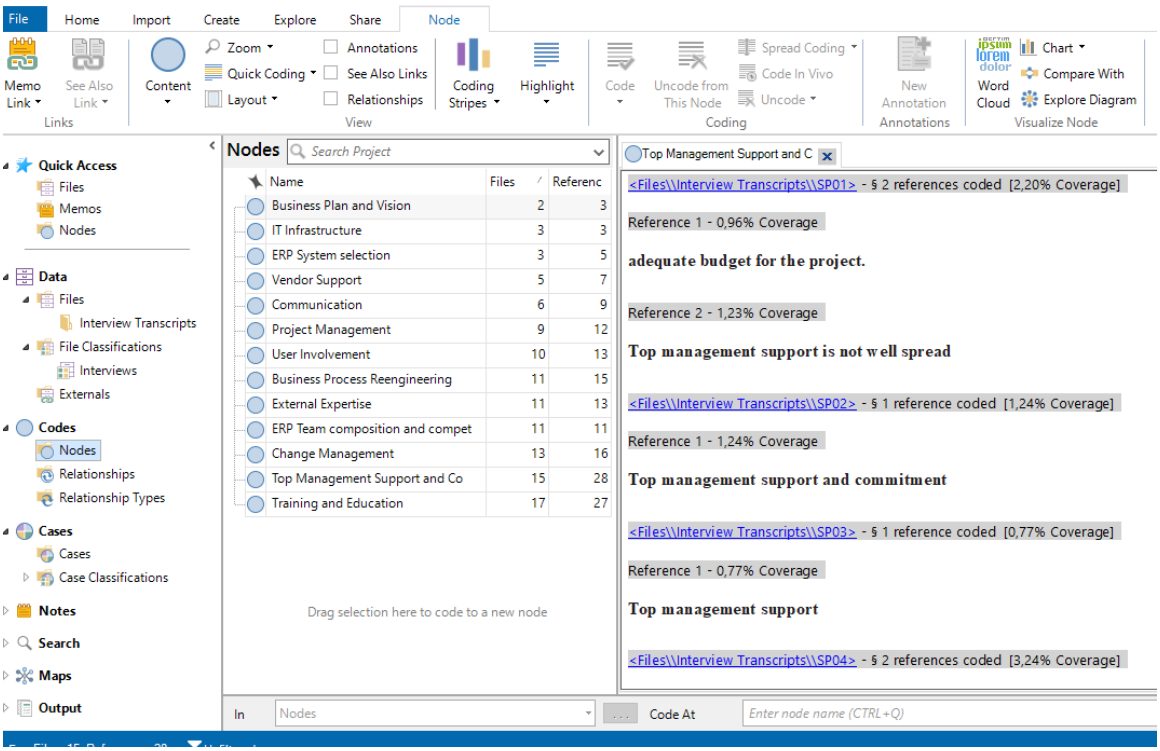

Figure 4. 5: Nodes in NVivo

The researcher found the number of frequency of references to certain nodes in the analysis to be an important metric. By using classical content analysis themes and nodes are counted (Leech and Onwuegbuzie, 2011). The counting can be used to identify patterns across qualitative data and often provides (frequency) counts more easily and maintain analytic integrity by allowing qualitative data to be analysed quantitatively (Miles *et al.*, 1994; Wilkinson, 2000). With the dataset that have codes emerging multiple times classical content analysis can assist the researcher in understanding what concepts were predominantly discussed (Leech and Onwuegbuzie, 2011). The number of references is the frequency of a node representing a critical success factor being mentioned directly or something linked to, related to, pointing to, implying or that can be interpreted as critical success factor.

The references, as a good indicator of the prevalence of a critical success factor should be read together with the number of participants mentioning it. The number of participants or interviewees mentioning something directly or linked to, related to, pointing to, implying

or that can be interpreted as a critical success factor can be an equally important metric in this analysis. The analysis found that certain factors were mentioned several times by different participants and that the number of participants mentioning specific critical success factors varied from one critical success factor to another as shown in Figure 4.5 below. That can also be a good indicator to the prevalence of the critical success factors under discussion.

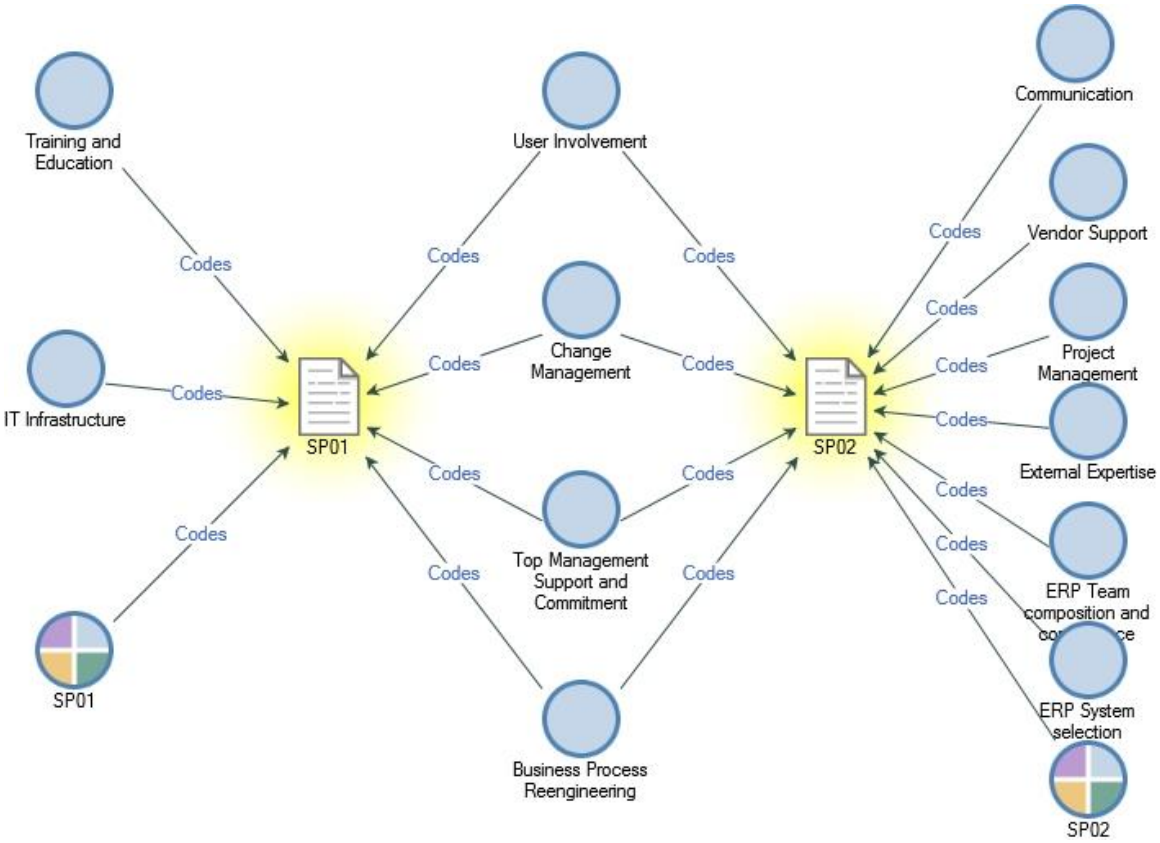

Figure 4. 6: Codes in Nvivo

The circular SP01 represented the "respondent" while the rectangular SP01 show the relationship of the respondent SP01 to the various emerged themes (critical success factors).

4.4 Identified CSFs which enhance the successful implementation of ERP systems

Thirteen (13) CSFs were identified as having the most influence on the successful implementation of ERP in the organisation REA. These are Business Plan and Vision, Business Process Reengineering, Change Management, Communication, ERP System selection, ERP Team composition and competence, External Expertise, IT Infrastructure, Project Management, Top Management Support and Commitment, Training and Education, User Involvement and Vendor Support. The results of the identified according to the number of coding references by the participants are illustrated in Figure 4.7.

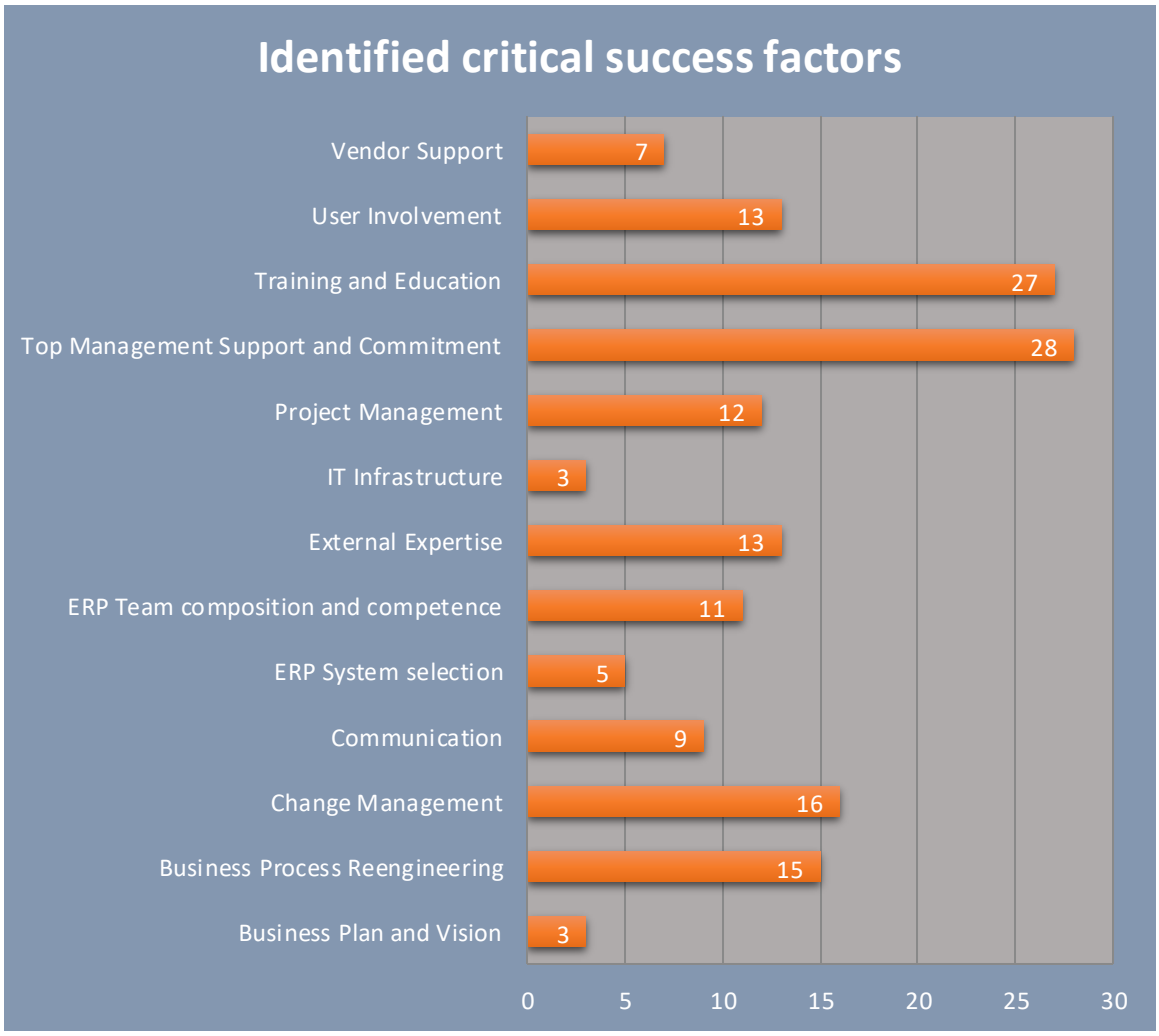

Figure 4. 7: Identified critical success factors

Figure 4.7 highlights the frequency analysis of the 13 CSFs that were chosen for this study. The frequency analysis is based on the number of times an interviewee mentioned the CRF in interview discussions. Top management commitment and support was mentioned most in the discussions with a frequency of 28 followed by training and education at 27. The least mentioned are IT infrastructure and business plan and vision at a frequency of 3 each. The frequency percentages for all the CRFs are given in Table 4.2. Table 4.2 below show that Top management support and commitment has the highest coding reference of 18%, while Business plan and vision has a coding percentage of 2%.

Critical Success Factors	Number of coding references	Percentage of coding References (%)
Top Management Support and Commitment	28	18
Training and Education	27	16
Change Management	16	10
Business Process Reengineering	15	9
User Involvement	13	8
External Expertise	13	8
Project Management	12	7
ERP Team composition and competence	11	7
Communication	9	6
Vendor Support	7	4
ERP System selection	5	3
IT Infrastructure	3	2
Business Plan and Vision	3	2
	162	**100%**

Table 4. 2: Ranking of the identified CSFs

The CSF, top management support and commitment ranks highest which indicates the vital importance of this factor. The least rank is given to IT infrastructure and business plan and vision. These rankings are as per the perception of respondents of this study. However, literature is abundant with the important role played by the vision and the business plan in any enterprise. For any business operation to take off there must be a vision that in some cases may not be written and placed in the reception area of the company but exists. It may be given to prospective new employees in their interviews without any written statement of the vision but it is still a company vision. Top management would not be active to pursue a project without the knowledge of a business plan and vision of that project. What could be missing is the training of workers in these areas that are vital to the sustenance of the business. The other interpretation could be that the least ranked critical factors could be so ranked because they are viewed to be at work when the top management are actively involved in the project. Thus their importance is associated with the level of involvement of project managers for indeed top managers cannot give direction to the project without the vision inspiring them and without a plan to follow.

The Table 4.3 below show how the participants responded to particular critical success factor.

Critical Success Factors	Project Manager (1)	Module Owner (4)	Super User (6)	End User (7)	Total (18)
Business Plan and Vision	100%	0%	0%	14,29%	11,11%
Business Process Reengineering	100%	50%	83,33%	42,86%	61,11%
Change Management	100%	100%	100%	28,57%	72,22%
Communication	100%	50%	16,67%	28,57%	33,33%
ERP System selection	0%	25%	33,33%	0%	16,67%
ERP Team composition and competence	100%	25%	50%	85,71%	61,11%
External Expertise	100%	75%	66,67%	42,86%	61,11%
IT Infrastructure	0%	25%	33,33%	0%	16,67%

Project Management	0%	75%	66,67%	28,57%	50%
Top Management Support and Commitment	100%	75%	100%	71,43%	83,33%
Training and Education	100%	100%	83,33%	100%	94,44%
User Involvement	100%	25%	50%	71,43%	55,56%
Vendor Support	0%	25%	50%	14,29%	27,78%

Table 4. 3: Participants Percentage Responses

From the Table 4.3 above Training and Education was responded to by the highest number of participants (94 %) with business plan and vision being responded to by (11 %) of the participants.

4.5 CSFs to prioritise when implementing ERP systems.

This section will discuss CSFs as viewed by respondents during the implementation of the ERP in the energy sector. As mentioned in section 4.3, the number of respondents or interviewees mentioning something directly or linked to, related to, pointing to, implying or that can be interpreted as a critical success factor can be an equally important metric in this analysis. The analysis found that certain factors were mentioned repeatedly by different respondents and that the number of respondents mentioning specific critical success factors varied from one critical success factor to another. For the discussion of the identified CSFs, the researcher decided to use the number of respondents mentioning a critical success factor as he wanted to discuss the participants experience and knowledge in the implementation of SAP. The researcher used the more straight forward form of representing prevalence 'the majority of participants' convention as argued by (Meehan *et al.*, 2000) The prevalence have been counted in terms of the number of different respondents who articulated the theme, across the entire dataset, or each individual occurrence of the theme across the entire data set (Braun and Clarke, 2006). That can also be a good indicator to the prevalence of the critical success factors under discussion

4.5.1 Top management support and commitment

The majority of participants at 83 % indicated that top management support and commitment are critical for the successful ERP implementation in REA.

Some of their perceptions regarding top management are the following:

> "The availability of top management support during the implementation of the project is critical for the provision of support in form of materials for the execution of the various project tasks." **SP06**.

> "Management offered maximum support during the implementation phase. Top management monitors the project progress and provides clear direction of the project." **SP07**.

These results corroborate findings by Zhang et al., (2003). They found that the job description of senior managers involves the crafting of goals that are rational and realistic. The ERP implementation plan must be communicated from top to bottom to show and give the much needed direction. Top managers are responsible for commissioning the project and therefore must be foremost in supporting team members in their respective roles. This is in line with the finding of Lee et al., (2010) that successful ERP implementation requires strong leadership, commitment and participation by the managers. The mission of top management is to create favourable environment for the successful implementation of ERP in order for the desired benefits to be realised. Various forms of support from the top management such as the budget allocation, encourage managers to corporate, facilitate the organisational environment for IT adoption and prepare changes brought by the new IT project.

> "The management did not give their best as they took a back seat during the implementation of the ERP project. Some managers took an observatory role." **SP18.**

The sentiments by **SP18** show that there are some members of top management who left the responsibility to closely monitor the project to others. He opines that top managers must not be only observers but participants.

> "For the implementation to be successful, there are issues that we submitted to management for guidance and which needed timely responses, but we did not get that. If there was management support it was going to help. Delays in getting responses make us not to proceed in time as challenges need to be addressed first." **SP07.**

The input by **SP07** shows a delay in getting responses from top management when it is needed within a certain timeframe. This resulted in downstream delays on the project. It is vital that top managers monitor project progress to provide a visible path for the project. Availability on the ground or accessibility through phones or other means must be ensured so that decisions that are pertinent can be done in time of need. Top management should dedicate time to revise plans, follow up on results and facilitate the management of problems. To achieve and realise the benefits of top management and support there should be total buy-in from the senior managers of the organisation so that their ownership of the project is visible to all team members.

> "With materials management module, I want to believe that our management offered maximum support in terms of materials management with I was involved in." **SP08.**

The stores clerk **SP08** is affirming the critical role displayed by the managers in availing the materials that were needed by field teams who work on the ground setting the project in motion. Without material provision no project, no matter how meticulously planned, can take off.

4.5.2 Training and education

The training and education is the second ranked CSF by the respondents. The respondents had their contributions about training as discussed in this section.

> "Training is needed for the operational efficiency of the system. There is need for certification on the part of supper users that will go a long way in reducing reliance on the consultants." **SP09.**

The efficiency of the system according to **SP09** is achieved through training. This means this CSF is critical to all operations by the business entity. He mentions lessening the reliance on consultants. Indeed the people engaged in the organisation can be regarded as more committed to its success as their livelihood depends how successful it operates. Consultants are from outside the organisation and are paid for their services after which they depart. If they do not impart their knowledge to the people in the project then the organisation hiring them may keep on recalling them for service, which turns out to be uneconomic. This finding is in line with that of Pabedinskaitė (2010) who found that education and training cannot be ignored if project implementation has to succeed.

"Training was done perfectly as the supper users visited the whole province to conduct training."**SP16.**

SP16 acknowledges that training was done and the evidence available shows that the whole province was covered. REA has a network that spans the whole country and training which can reach all corners of the province is targeted at improving the efficacy of operations.

> "User specific training and handover was needed for the success of this project. The training budget was too tight as we needed to adequately train users until they were comfortable to handle issues on their own." **SP15**.

Training is always run on a budget. The hyperinflationary situation in Zimbabwe can make budgeted amount insufficient for what they were intended. This was the situation with the

operations at REA. The budget dictates the ability any organisation can have to implement training.

> "Project management skills were lacking in some team members and also the team was not as diversified as I thought it should have been. The timeframe for training people for them to acquire sufficient knowledge was not enough." **SP03**.

SP03 reveals how team members had no diversified skills and as a result the timeframe for training was not sufficient to close the gap. This means in implementing a project there must be enough skills that complement each other to make the team complete. This also requires the human resources to recruit team members with diversified skills to meet the needs of tasks of the project. The poor training of team members could be the reason why respondents ranked training and education so highly amongst many CSFs identified. These findings echo what Cazier and Gill (2003) found regarding the success of IT adoption that it may be greatly influenced by how and individual personal values and perceived values of the organisation overlaps. They posit that to ensure personal values and perceived values are mapped properly with the user's expectation, training will be able to bridge the gap between the two. The effect of training on implementation success is contingent to both technical complexity and task independence. Its absence ushers in despondency amongst workers will fail to perform and achieve acceptable output levels.

> "Retraining and refresher training is very necessary." **SP11.**

SP11 raises the aspect of retraining or refresher courses as critical to success of projects. This is probably so because when people are trained some skills do not immediately find use and so they wane. When they are eventually needed it is possible that the residual skills in the individual may not be sufficient. Retraining affords team members to rectify some mistakes in procedure of doing things which creep into daily processes and people get used to them as though they are the norm. This corroborates Laughlin (1999) who found that lack of understanding of the system on the part of workers can make them invent their own

system as a substitute. Limited training in SAP skills was a concern for most of the users, as also found by (Huang and Palvia, 2001a). However, there was a desire to know more about SAP and to learn how to use it more effectively. There is a need for a more systematic SAP training and development approach, which should include exposing all employees to the practical examples of SAP and major business process changes implementation.

4.5.3 Change Management

Change management was ranked the third CSF by the respondents. The perceptions by participants about change management were varied.

> "Users fear that the system may render the jobs redundant so they resisted using the system." S**P06.**

The fear by users is bound to be there unless there is training for them to adapt to new systems. That change needs to be managed properly or there would be resistance as narrated by **SP13:**

> "There was resistance to change by the employees themselves." **SP13**

The existing organisational structure in REA is not compatible with the structure, tools and types of information provided by ERP systems. The resistance revealed in the study confirms the finding by Dezdar and Sulaiman (2009) that changes can adversely affect both operational structure and employees who may not be prepared for any change. As a result they may assume attitudes that are detrimental to the progress of the project. Managed change can take employees to explore new opportunities as they are motivated to make progress as individuals and as a body corporate.

> "Understanding of the system and active participation, and assigning of proper roles are crucial. I think, in our case I can say a proper change management system properly designed right from the onset is a prerequisite." **SP04.**

The narration by **SP04** emphasizes the importance of being organised when effecting change. Bingi *et al.* (1999), emphasises how pertinent it is to be conscious of the implications of such projects on the workforce in terms of tenure security. According to Nah *et al.* (2001) change management invokes the need for the implementation team to formally prepare a change management programme that must be expertly handled.

> "Some feel challenged when some work was allocated to others." **SP16.**

> "As usual people resist change and we got a number of people who would not cooperate." **SP05**.

The narrations by **SP16** and **SP05** reflect team members who are self-centred. Al-Mashari et al (2003) also found that there cannot be any proper transformation of the organisation when there is no dovetailing of anticipated changes to the goals of the project. The current systems need over hauling to achieve the best possible standard. During the interactive interviews some participants acknowledged the need for change awareness during the early stages of implementation to prepare the employees for impending changes that might be brought by the new system.

4.5.4 Business process reengineering

Business process reengineering was identified as critical success factors. Participants proffered their perceptions with regarding the reengineering at REA.

> "I think there was no appreciation of such processes because the organisation has not implemented many of these processes and conversion from a manual process to

> fast and refined processes resulted in problems with end users and supper users,"S**P03.**

Business process reengineering is constructed in the beginning of the project phase. According to Ehie and Madsen (2005) the implementation of an ERP system is more than just changing the software or hardware systems; it will enable the organisation to achieve a higher level of performance through a restructured business process.

> "When you introduce a system you bring standardisation so the challenge is that it cannot be configured to accommodate varied business processes."**SP06.**

The problem that **SP06** opines about is failure to adjust the new system to varied applications prevailing in the organisation. Holland and Light (1999) found that firms must identify existing business model which work with their chosen IT system and map out the course of action at the beginning of the ERP implementation. The majority of the participants at 61 % made reference to business re-engineering processes as a critical success factor for successful implementation of ERP systems. One participant emphasised the need for pre-launch feasibility study to find out which modules to implement and their timing depending on the business requirements. There were instances identified of lack of appreciation by users of some of the business process as they felt they were not automated to their expectations.

> "Business reengineering process there was too much customisation of the current system to suit the new system. There are others things they did not manage to customise but others they did well. Also the system could not be customised on all things because it came within inbuilt configurations which when changed might have disturbed the whole system." **SP10.**

In their study Holland and Light (1999) posit that companies should be willing to change the business process to fit with the software of the adopted ERP because software should not be modified as far as possible to avoid encountering future challenges especially future

upgrades of the software. The philosophy of the business process changes besides to align the business process with the software is to simplify the process so as to eliminate redundant activities.

4.5.5. User involvement

Fifty six percent (56 %) of the participants made reference to user involvement as a critical success factor for successful implementation of ERP systems. User involvement refers to the psychological state of the individual and is defined as the importance and personal relevance of a system to a user (Bhatti, 2005).

> "User involvement during the blue print preparation process is very important for the redesigning of the business processes. For the first phase they were supposed to involve other people from the provinces during the development of blue prints." **SP04.**

The user should be involved in the stage of definition of the company's ERP system needs and also in the implementation of this system. The management need to give information about the benefits to motivate the all users of the new system. The users who are a critical component of stakeholders needed to appreciate the relevance of the project and be committed to it. User involvement enables the project team to have positive and ongoing conversations with stakeholders.

> "Not enough engagement was done between the provider and end users. They should involve the stakeholders like the employees." **SP17**.

The sentiments show that engagement of all members of the organisation was desirable down to the shop floor worker so that they appreciate and take ownership of system. Employees are very critical to the success of any project which they are supposed to work on and promote.

4.5.6 External expertise

External expertise means that within the organisation there may not be the required skills for certain demands of the project. The observations by participants had various pointers to what the external experts should possess.

> "Consultants at times failed to understand the business process and operation of REA."**SP03.**

> "On the issue of consultants it was lack of experience, the package requires both expertise and experience."**SP15**.

External consultants involved were not that skilled in unbundling the project. This is a serious drawback. External expertise must be what the name means exactly – experts. Well experienced expects are able to thoroughly access whether and strategic advantages is grounded by retaining a specific business process and are able to promote customisation (Haines, 2009). They must understand the business model that is currently being used so they can determine how to introduce the new ERP. Various participants talked about lack of expertise attributed to the high turnover of consultants as the new members needed more time to fully understand the REA legacy system.

> "On consultants they performed very poorly because they continuously change their staff, which compromised their contribution to the project." **SP01**.

> "I think there is a skills gap and unwarranted staff turnover on the implementing partner. There was lack of continuity due high turnover of consultants" **SP18**

SP01 and **SP18** bring out the poor showing done by the external consultants. The change of staff on the part of the consultants meant that continuity was threatened. New workers from the consultants needed to undergo induction into the project first before they could be

very useful. REA personnel could easily detect skills gap in the part of the external consultants. Hence these external consultants were no experts on several fronts.

4.5.7 Project Management

Project management was listed by 50% of the participants made reference to project management as a critical success factor for successful implementation of ERP systems. The participants proffered their experience with the implementation of ERP systems at REA:

> "Project management skills were lacking in some team members. Migration strategy needed the use of parallel method"**SP02**

> "There should be monitoring and evaluation of the system. Stage implementation was ignored, that is module at a time"**SP04**.

The observations done by the participants are that not all team members were abreast with implementation of project. This beckons the CSF discussed earlier about the importance of training and education. According to **SP04** the launching of several stages simultaneously was confusing to some extent. He preferred the unbundling of one stage at a time. Pabedinskaitė (2010) avers that project management is a professional activity based on contemporary scientific knowledge, experiences, methods, means and technology. It focuses on high results.

> "We found the majority of the modules are at 30% of the functionality but we have exceeded our budget. If we look at the contract that was given, the fund did not monitor to see that the provider was able to they have met the other side from the contractual point of view." **SP07.**

Funding the ERP project at REA met with failure to work within the budget provided. SE opines lack of monitoring to see how the budget was being consumed per each stage level. Indeed to exceed the budget at only 30 % of functionality achieved is bound to have serious consequences for the whole project. Akkermans and van Helden (2002) found that successful project implementation requires that the organisation engages in excellent project management which encompasses a clear definition of objectives, development of both a work plan and resource plan and careful tracking of project success. Grabski *et al.* (2011)are clear that project requirements must be unambiguous. The requirements of the project must be easy to interpret at every step.

4.5.8 ERP team composition and competence

Forty percent (40 %) of the participants made reference to ERP team composition and competence as a critical success factor for successful implementation of ERP systems. Some of the observations on this CSF by participants are quoted:

> "Team selection rotation for new ideas and supper user representation did not cover all of the departments and regions." **SP13.**

> "Implementation team composition was not evenly distributed according to regions." **SP05**.

> "Have no problem with competence of the team, composition of the team I had a problem with that and I had to write a recommendation before the project started." **SP07.**

SP13, **SP05** and **SP07** disclose there was inadequate representation of departments which should have been achieved by a balanced team selection as well as timely rotation to make all stakeholders to participate. The consequences of biased team selection include ineffective coverage of the ERP systems in the province which compromises the whole

project. The representation by letter done by SE was not taken seriously to effect any meaningful changes in the team compositions. Rothenberger *et al.* (2010) found that composition of ERP teams must include people with requisite skills and experience that have evidence or proof. In the case of REA such people should have been scouted from all departments according to the regions. If the numbers were not enough regarding skills, then the teams should have been constructed to balance skilled members with the unskilled so that there could be transfer of skills within each team. This would have ensured that by the end of each stage skills would be residual in all members of any given team.

> "HR of which is the department of which the central records managements reside, there was no one represented." **SP15.**

The narration by **SP15** shows an omission that was made. The human resources department should not be ignored as it deals with fair placement of skills in places of need. This is what Somers and Nelson (2004)found, that representation must be without bias. It must be equitable with members drawn from all departments of the organisation.

4.5.9 Communication

Communication was chosen by just above thirty three percent (33 %) to be a critical success factor for successful implementation of ERP systems.

> "Departmental cooperation was not there." **SP17.**

> "We need to have regular steering committee meetings, where management will be appraised of progress whilst be given reports on the progress so far."

The critical value of communication to any organisational task cannot be overemphasised. There were challenges in this regard. Communication is one of the most challenging and difficult task in an ERP implementation project. Kim *et al.* (2005) found how significant it

is to create that understanding and agreement on how to implement and share information among project team members and to make known the goals and outcomes at each stage of implementation. Bhatti (2005) opines that communication must include an overview of the system and reasons for applying it consistently.

Participants identified that communication should be continual, strong, timely, effective, open, clear, and constructive. The whole organisation must know the parameters of the project and its pre-determined objectives. They suggested to having a steering committee for information dissemination. Some participants stated that communication should occur at all levels in the project.

4.5.10 Vendor support

Aspects of consultant and vendor support were identified as critical success factors by 27.78% of the participants who made reference to vendor support as a critical success factor for successful implementation of ERP systems.

> "Also talk of issues to do with expertise on the part of the consultants, one will tell you this is difficult, but at the end it will work out if there knowledgeable."**SP14.**

> "Under the circumstances we just need to send a couple of our guys for training so that they will be the first line of consultancy so that we are able to do that internally." **SP04.**

The need for vendor support is revealed by the above narrations with suggestions for sending internal employees for training in the ERP systems so they can become in-house consultants. Thong *et al.* (1996) found that companies usually seek outside help from experts. For any technology to be acceptable, sustainable and eventually to be successful, proper support structures should be put in place.

"When the workflow was not working properly, the consultants were not there to correct." **SP13**.

SP13 mentions some teething problem they experienced with their vendors of the programme. They must sell programmes that they are able to work on otherwise their consultancy becomes fictitious. Arens *et al.* (2000) found that competent vendors are capable of providing ICT blue prints that can be used by the whole company at all levels.

In the absence of consultants the company personnel must have the knowledge to run the systems. Relying only on external consultants is retrogressive as the work will stall in the absence of these experts. Consultants must be engaged only when skills are unavailable from within the company. **SP13** they lacked the skills that were necessary to utilise when the consultants were not there.

4.5.11 ERP system selection

Just seventeen percent (17%) of the participants made reference to ERP selection as a critical success factor for successful implementation of ERP systems. The participants disclosed their experience with ERP system selection.

"As mentioned earlier some people were not comfortable with SAP. It is important to have full knowledge of the capability of the system."**SP02**.

"During implementation others were of the view that the contract should have been awarded to other companies for other software not SAP"**SP11.**

"There is need to scout for best fit for the system and organisational strategy"**SP07.**

The foregoing narratives betray the process that was used to select the ERP system that was being implemented. **SP02** suggests that it is critical to know the full capability of any system before it is purchased. The shortcomings of this system were only discovered during

the implementation stage according to **SP11**. The comment by **SP07** reveals the preparatory process that must be undertaken prior to accepting any software package including the organisational strategy. The system must support the strategy in place and not to completely eradicate what has been functional for decades with new uncharted ERP software. Grabski *et al.* (2011)says detailed requirements specification for ERP software selection will increase the probability that the ERP system will meet the organisation's requirements and support the newly redesigned operational processes. Consultant should be used who have adequate knowledge in the industrial field and ERP system that can help the company to develop and implement a system aligning with the company business needs. Therefore, it is important that the selected ERP package fits within the organisational needs and supports the organisation's business processes (Somers and Nelson, 2001). Davenport (1998) opines that organisations often fail to consider whether the chosen system will fit their overall business processes and enable them to avoid, or at least minimise, software customisation.

4.5.12 IT infrastructure

Eleven percent (11 %) of the participants made reference to IT Infrastructure as a critical success factor for successful implementation of ERP systems. IT infrastructure is a comprehensive term that includes equipment, network and applications.

> "We have poor IT infrastructure." **SP05**.

> "Talking about machines, the bandwidth from the IT side must be compatible. We experienced poor connectivity IT accessibility." **SP03.**

The launch of the ERP system exposed the inadequacy of the IT infrastructure in REA. This means there should have been a prior target of upgrading IT infrastructure before attempting to undertake ERP upgrading. The ERP system would not be fully functional when placed on an IT framework which cannot sustain it. Connectivity was also not fully available because of the current IT hardware. Bhatti (2005) found that adequate IT

infrastructure, hardware and networking are critical to a successful ERP system implementation. Ghosh (2003) proposed that executives must have a complete understanding of the technical challenges involved in adoption of a new enterprise wide system. He thus proposed three elements to be considered prior to any activity are networking upgrade, hardware upgrade and enabling global support.

4.5.13 Business plan and vision

Eleven percent (11%) of the participants made reference to business plan and vision as acritical success factor for successful implementation of ERP systems.

> "I think managers should have first defined what they expect from the system in relation to the key result areas."**SP11.**

> "In my view the system should have been made in terms of the key result areas that managers have and the managers should have realised how the system would add value."**SP18.**

The sentiments given by **SP11** and **SP18** are prerequisites for any project that is deemed to succeed. Key results areas are what the organisation exists for. No system can be successfully designed without the knowledge of key results or performance areas otherwise it is bound to be a misfit. A details analysis of the organisation vision and needs is of great importance when acquisition of ERP is being planned and analysed. Calogero (2000) found that some firms because of technical incompetence choose systems that are not suitable for their operations. If they are being promoted by a vendor the vendor may not disclose the shortcomings because they want to make a sale and they do not have a more appropriate system to sell.

4.6 Comparison of identified CSFs and CSFs in literature review.

The section presents the comparison between the identified CSFs in the research and the CSFs found in the literature review. The table 4.4 presented the results of the comparison conducted in the study between the 13 identified CSFs and those discussed and unearthed in the literature review. On top of the table 4.4 is the list of identified CSFs from the research. A letter X is placed below the particular critical success factor along the row of corresponding author. The cumulative citations of the CSFs as identified by the various authors are indicated at the bottom of the Table 4.4.

Research Findings Critical Success factors	**Business Plan and Vision**	**Business Process Reengineering**	**Change Management**	**ERP system selection**	**ERP Team composition and competence**	**External Expertise**	**IT Infrastructure**	**Project Management**	**Top Management support and commitment**	**Training and Education**	**User Involvement**	**Vendor support**	**Communication**
Author													
Samuel *et al.* (2013)		X	X		X			X	X	X	X		X
Pabedinskaitė (2010)	X	X	X						X	X	X		X
Nah and Delgado (2006)	X		X	X				X	X				X
Nah *et al.* (2003)	X	X	X		X			X	X				X
Al-Mashari *et al.* (2003)	X	X	X					X	X	X			X
Umble *et al.* (2003)			X		X			X	X				
Esteves and Pastor (2001)		X	X			X		X	X	X	X		X
Nah *et al.* (2001)	X	X	X		X			X	X				X
Shanks (2000)			X		X	X			X	X			
Total Appearance	**5**	**6**	**9**	**1**	**5**	**2**	**0**	**7**	**9**	**5**	**3**	**0**	**7**

Table 4. 4: Research CSFs vs Reviewed Literature CSFs

An important observation from the Table 4.4 is that 11 of the 13 identified CSFs by the participants featured prominently among the various researchers. According to the researcher, the appearance of these CSFs indicated that they are deemed to be of paramount importance in the implementation of ERP systems not only in the Zimbabwean Electricity energy sector but also for other settings as indicated in Table 4.4.

It is also observed that from Table 4.2 Top management support and commitment, Training and Education, Change management and Business process reengineering (CSFs identified in the research findings) had the highest number of coding references. Whilst on Table 4.4 Change management, Project management, Top Management support and commitment and Communication appeared more frequently among the CSFs identified in literature review. The business Process Re-engineering and training and education appeared on the highest list of prioritised list of identified CSFs. This might be attributed to the fact that REA is implementing an ERP for the first time hence the need for intensive training and education of users. Also as an organisation moved from a legacy system to a new ERP system business process re-engineering is required in order to align processes with the new ERP system. The appearance of the four CSFs on the highest priority list indicate that they are deemed important to the Zimbabwean context as well as REA as all the participants were drawn from REA.

The research study has revealed that Vendor support and IT Infrastructure raked the lowest in the citations by author as in Table 4.4. This might be attributed to fact that the context in which the studies were conducted has a well-developed IT Infrastructure and possibly the ERP software were sourced directly from the suppliers unlike REA which sourced the ERP software through a third part vendor.

4.7 Trustworthiness of Research Findings

The discussion on trustworthiness of research findings is a reflection of section 3.8 where the grounds for establishing criteria fortrustworthiness were established. These are based on the Lincoln and Guba (1985) criteria for trustworthiness.

4.7.1 Credibility

The researcher solicited for feedback on the preliminary and emerging findings from some of the people interviewed. This was to find out whether the transcription and interpretation ring true and identify the researcher biases, misunderstanding of what was deduced. Member checking also gave an opportunity for members (participants) to check (approve) particular aspects of the interpretation of the data they provided (Merriam, 1988; Doyle, 2007).Also, it was a way of finding out whether the data analysis is congruent with the participants' experiences.

After the researcher completed a preliminary draft of the findings and discussions, the researcher went further and met with each of selected participants to verify the quotations from their transcripts; share the findings, and to garner their reactions. During the debriefing interview, the researcher restated and summarized information and then ask the participants to determine accuracy. The participants gave their perspectives by either agree or disagree that the summaries reflect their views, feelings, and experiences, and if accuracy and completeness are affirmed, if so the study is then said to have credibility (Lincoln and Guba, 1985; Creswell and Creswell, 2017).

SP08, **SP09**, **SP13** and **SP17** were interviewed and the four participants described the following vignettes. For each vignette, a brief contextual background is provided and their responses to the transcription and preliminary results.

Participant **SP08** is a stores clerk who has been involved in the SAP implementation as an End user for 6years. **SP08** was an ideal and enthusiastic participant. In my desire to conduct a good research, **SP08** was of the view that I had transcribed well and my attention to detail was acceptable.

"This is correct presentation of my response".**SP08**

Asked to comment on the preliminary results, **SP08**was of the view that the results represents the general perspective of the participants. This is what **SP08** noted;

"It's showing a general perspective of the participants"

Participant **SP09** is Human resources and Administration officer who is one of the super user of the Human resources management module. On the transcription **SP09** was of the view that most of the information was captured correctly. This was the response:

"I can say that all information was captured correctly as per my responses"**SP09.**

On the findings and interpretations this is what **SP09** said;

"The findings are proving that there was lack of training during the project implementation as well as support of management"

Participant **SP13** is the IT Administrator of the organisation whose responsibility in the SAP implementation project is the Project Manager. **SP13** was very passionate about being interviewed and contributed enthusiastically.**SP13**'s interview was the longest as it took almost 30 minutes. On the debriefing interview **SP13**was not affirmative about the transcriptions but gave it a thumbs up. This following is what was said but did not give a comment on the preliminary results.

"I think we can work will the responses. They are okay"**SP13**

Participant **SP17** is the receptionist whose responsibility in SAP is the creation of purchase orders and is one of the end user who initiates the procurement processes. On the transcription **SP17** was positive about the transcription.

"It is consistent to my responses and was captured accurately"**SP17.**

On preliminary results and findings**SP09**was in agreement with the and reiterated noted that;

> "Training and top management support are key success factors for the implementation of SAP system"

Through the presentation of four personally experienced vignettes the researcher examined the role of member checking on establishing credibility of the findings. The researcher was pleased by their enthusiastic reactions to my work and gland to hear that they felt they had benefited from the process. The greatest benefit of conducting member checks was that it allowed the researcher the opportunity to verify the accuracy and completeness of the findings which then helps to improve the validity of the study (Harper and Cole, 2012; Amankwaa, 2016).

4.7.2 Transferability

The transferability is highly dependent on the research design strategy. The research design method used in this research is discussed and documented in chapter 3 for the readers to make their own assessment of the effectiveness of the techniques hence the transferability of the research. The researcher provided a rich description of the setting structure. The Section 3.5.2 provided a detailed research method, context and the assumption underlying the study. The researcher also provided very detailed descriptions of settings, participants, data collection, and analysis procedures in Section 3.6 and the questionnaire as shown in Appendix D as a way of making his accounts more credible to show that they was diligent in his attempts to conduct respectable research (Anfara Jr *et al.*, 2002).

4.7.3 Dependability and Confirmability

The researcher archived the data collected in a manner that makes it easy to thereby creating an audit trail. By keeping interview notes and various drafts of interpretations forms parts of creating audit trails. Audit trails as suggested by Lincoln and Guba (1985) help independent readers to authenticate the findings of the study by following the trail of the research. This is because an audit trail in qualitative study describes in detail how data was collected, how categories were derived and how decision were made throughout the study (Merriam and Tisdell, 2015). In this regards section 3.6 of chapter 3 detailed the data collection processes conducted by the researcher, whilst Figure 3.1 detailed the data manipulation processes using the Nvivo software. Section 4.3 described how decisions on the findings were arrived at. According to the guidance from Lincoln and Guba (1985) and based on the above results it can be argued that the research achieved a good degree of confirmability.

4.8 Conclusion

The chapter has discussed the CSFs as proffered by the participants in the study. These included top management support and commitment which was ranked highest through to business plan and vision which had the least number of subscribers. Some themes emanating from the findings show an inadequate budget was in place for the ERP system launch as it was exceeded with only 30 % of the ERP system functional. The team compositions were another source of discomfort as these were not representative of all the regions in the province. The following chapter will present the summary, findings and recommendations deriving from the study.

CHAPTER 5: RESEARCH CONCLUSIONS

5.0 Conclusion

The previous chapter has presented and discussed data. In this chapter the findings are given. Recommendations are also provided which emanate from the findings.

5.1 Review of Research Aim and Objectives

The study analysed the perspective of SAP implementers in REA one of the organisation of the energy sector in Zimbabwe. This was done through a qualitative case study research methodology with the aim and objectives drawn in order to address the research problem statement.

The aim of this research was to identify CSFs for the successful implementation of ERP system in the Zimbabwean electricity energy sector. Hence, to address this research aim the following main research question was posed:

(a) What are the critical success factors which enhance the successful implementation of ERP systems?

The main research question was further broken down into two sub-questions:

(a) What are the critical success factors to prioritise when implementing ERP systems in the electricity energy sector in Zimbabwe?

(b) Which strategies can the Zimbabwe electricity energy sector apply to improve ERP implementation success?

In an attempt to answer the research questions a total of three research objectives were set in order to respond to the above-mentioned questions and are discussed below:

(a) To identify the critical success factors which enhance the successful implementation of ERP systems.

The data was collected through in-depth interviews with the participants. The thematic analysis method was used to interpret the data and Nvivo software was used to manipulate the data to derive the CSFs. The main concepts generated were assigned an appropriate code to represent the factor. The findings of the study identified 13 CSFs that have an impact on the successful implementation of ERP systems in REA. The identified CSFs are Top Management Support and Commitment, Training and Education, Change Management, Business Process Reengineering, User Involvement, External Expertise, Project Management, ERP Team composition and competence, Communication, Vendor Support, ERP System selection, IT Infrastructure and Business Plan and Vision. These factors were consistent with those found in literature on critical success factors on the implementation of ERP in developing countries.

(b) To identify critical success factors to prioritise when implementing ERP systems in the electricity energy sector in Zimbabwe.

In order to identify the CSFs for prioritisation, a frequency count analysis based of the number of coding references was used and the ranking of the CSFs according to their criticality are stated below. The success factor were grouped as highest criticality medium criticality or less critical factor based on the frequency count as the theme emerged from respondents.

THE HIGHEST CRITICAL FACTORS	THE MEDIUM CRITICAL FACTORS	THE LESS CRITICAL FACTORS
➢ Top Management Support and Commitment ➢ Training and Education ➢ Change Management ➢ Business Process Reengineering	➢ User Involvement ➢ External Expertise ➢ Project Management ➢ ERP Team composition and competence	➢ Communication ➢ Vendor Support ➢ ERP System selection ➢ IT Infrastructure ➢ Business Plan and Vision

Table 5.1: The Critical importance of the identified CSFs

Themes on the critical success factors are based on the highest frequency count. Top Management Support and Commitment, Training and Education, Change Management and Business Process Reengineering were identified as the highest critical factors. These are more important to overcome critical challenges in ERP system implementation. The medium critical factors are User Involvement, External Expertise, Project Management and ERP Team composition and competence. The less critical factors identified are Communication, Vendor Support, ERP System selection, IT Infrastructure and Business Plan and Vision.

(c) To recommend strategies that the Zimbabwe energy sector may apply in improving ERP implementation success.

From Table 4.2, the four CSFs which are at the most high critical level can significantly impact of the success of the implementation of SAP. It is therefore recommended that REA should focus on addressing these factors at the highest critical level namely, Top Management Support and Commitment, Training and Education, Change Management and Business Process Reengineering.

A review of successful implementation of SAP systems has shown that top management support and commitment is the most critical success factor to ensure change management and smooth roll out of SAP. Top management support and commitment is not only required for setting out vision and direction for business, it is also important for harnessing the energy and productivity for employees (Al-Mashari *et al.*, 2003). Therefore it is recommended that:

- Top management must exist throughout the full implementation of the SAP system in order to constantly monitor progress of the projects and provide direction to the implementation.

Inadequate training and education has been cited as one of significant factor for SAP system implementation failure. An appropriate plan for end user training should be selected. It is therefore recommended that:

- Organisation intending to successful implement SAP systems should make adequate investment in training of internal trainers to reduce costs of external consultants; Training for employees according to the roles they will play; Involvement of users in the implementation process; Change management training for managers; and Project management training for a selected number of internal employees. ERP implementation in organizations is a continuous maturity process which the organization needs to go through to build knowledge (Law *et al.*, 2010).

From the findings, change management is shown to be also an important factor. It is recommended

- To quantity and qualify the amount of change the organisation is undertaking and look at the effects of business process reengineering in the organisation. Organisation in developing countries implementing ERP system for the first type

should change business processes in order to match those of the ERP system and take advantage of the best practice it offered as most of the ERP systems are developed in the context of the developed countries.

Business process reengineering was identified as one of the top four critical success factor for the successful implementation of ERP system projects. It is therefore recommended that:

- Business process reengineering should be carried out before the selection of the ERP software. This allow the identification of pain points and process owners. This is important because employees may be experiencing unique pain points that the ERP vendor may not have accounted for when designing best practices. Process owners prioritise process work over considering new technologies. They understand that streamlined cross-functional processes enable efficiencies and new organisational capabilities.

5.2 Research Limitations

This study has certain limitations which may present an opportunity for further research. This research only focused on REA. This means that the results from the case study could be specific and limited to context of the organisation in this study. Since the participants to the study were limited to REA, this study should be extended to other organisations within the electricity energy sector. Secondly, since ERP system implementations are a contemporary subject, the identified factors and their importance are likely to undergo changes because of specificity to maturity levels of the organisation. Therefore, this research provided an insight of the CSFs at a specific context. Thirdly, the use of members of staff familiar with the implementation was regarded as most appropriate because the information needed for the ERP implementation was qualitative in nature. Though interviews were in person or by phone, some interviewees seemed biased and defensive on matters in which there were directly involved. Nevertheless in spite of the limitation, this

research study makes an important contribution to theory and practice because there is lack of studies conducted to address the issues the ERP implementation project in the energy sector of Zimbabwe.

5.3 Beyond this Research

The contributions of this research are various, theoretical, practical and methodical. With this knowledge managers of implementing organisations can make necessary plans and devise appropriate strategies on which CSFs to focus on for achieving implementation success and identify which once are more pertinent to the organisational context. One of the limitation of the study, is that it is conducted in REA one organisation of Zimbabwean electricity energy sector. On the identification of CSFs if it could be conducted by researchers in different organisations of the energy sector to obtain a deep understanding of CSFs and the characteristic within a changeable organisational context. Also future study recommendation is to conduct a multiple case study that could use two or more organisation so that similar or contrasting results can be predicted (Menon, 2020).

Secondly, using the interpretive qualitative method as provided by the study, the researcher focused on the identification of CSFs in the successful implementation of ERP system projects from the perspective of the implementation team. If this study were to be replicated it would be necessary to add senior leadership and external consultants role groups. This will enable to get the senior leadership and consultants' perspectives from both business and external expertise. This researcher felt that the approach relied on the opinions of implementers and users all internal members and therefore it is subjected to bias. It should incorporate the ideas of external expertise such as consultants and ERP system vendors.

Thirdly, the ERP system chosen for this current study was SAP, since the organisation has implemented SAP system. As similar study can chose another ERP system such as Oracle, Microsoft or Info ERP systems to arrive at the results

5.4 Conclusion

According to Haines and Goodhue (2003), identifying factors that lead to success or failure of ERP system is of increasing importance . From a practical point of view, understanding the determinants of ERP implementation success will benefit both the adopting organisation and the software vendors. Decision makers will be able to formulate necessary strategies to enhance ERP implementation success while vendors will build products that satisfy the customers and therefore make more profit. The purpose of this research was to identify those factors that are deemed critical in influencing the successful implementation of ERP system projects in the Zimbabwe electricity energy sector. An interpretive method approach was used to identify the CSFs and ranking them according to criticality that are responsible for successful implementation of ERP system projects. The research study identified four primary CSFs, top management support and commitment, training and education, change management and business process reengineering were most critical in the influencing of successful implementation of ERP system projects in the Zimbabwean energy sector. The medium critical factors were identified as User Involvement, External Expertise, Project Management and ERP Team composition and competence. Communication, Vendor Support, ERP System selection, IT Infrastructure and Business Plan and Vision were identified as less critical factors. Though not conclusive, the results of the study have demonstrated that the participants' opinions and literature are indeed related but the perceived relative importance may differ between identified and those found in literature.

6.0 References

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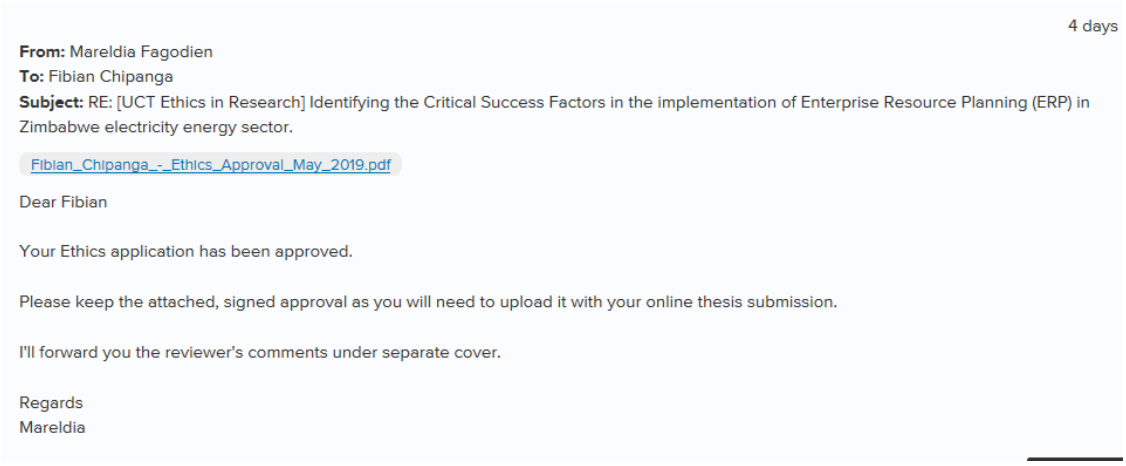
7 APPENDIXES

Appendix A: UCT Research Ethics Approval



4 days

From: Mareldia Fagodien
To: Fibian Chipanga
Subject: RE: [UCT Ethics in Research] Identifying the Critical Success Factors in the implementation of Enterprise Resource Planning (ERP) in Zimbabwe electricity energy sector.

Fibian_Chipanga_-_Ethics_Approval_May_2019.pdf

Dear Fibian

Your Ethics application has been approved.

Please keep the attached, signed approval as you will need to upload it with your online thesis submission.

I'll forward you the reviewer's comments under separate cover.

Regards
Mareldia

EBE Faculty: Assessment of Ethics in Research Projects

Any person planning to undertake research in the Faculty of Engineering and the Built Environment at the University of Cape Town is required to complete this form before collecting or analysing data. For more info regarding the procedure of completing the form please log onto http://www.ebe.uct.ac.za/research/ethics/.
When completed it should be submitted to the supervisor (where applicable) and from there to the Head of Department. If any of the questions below have been answered YES, and the applicant is NOT a fourth year student, the Head should forward this form for approval by the Faculty EIR committee: submit to Ms Zulpha Geyer (Zulpha.Geyer@uct.ac.za; Chem Eng Building, Ph 021 650 4791).
Students must include a copy of the completed form with the thesis when it is submitted for examination.

Name of Principal Researcher/Student: FIBIAN CHIPANGA Department: Department of Construction Economics and Management

If a Student: CHPFIB001 Degree: MSc in Project Management Supervisor: Dr Nlau-Tsu Tuan

If a Research Contract indicate source of funding/sponsorship: N/A

Research Project Title: Identifying the Critical Success Factors in the Implementation of Enterprise Resource Planning (ERP) in Zimbabwe electricity energy sector.

Overview of ethics issues in your research project:

Question 1: Is there a possibility that your research could cause harm to a third party (i.e. a person not involved in your project)?	YES	NO ✓
Question 2: Is your research making use of human subjects as sources of data? If your answer is YES, please complete Addendum 2.	YES ✓	NO
Question 3: Does your research involve the participation of or provision of services to communities? If your answer is YES, please complete Addendum 3.	YES	NO ✓
Question 4: If your research is sponsored, is there any potential for conflicts of interest? If your answer is YES, please complete Addendum 4.	YES	NO ✓

If you have answered YES to any of the above questions, please append a copy of your research proposal, as well as any interview schedules or questionnaires (Addendum 1) and please complete further addenda as appropriate.

I hereby undertake to carry out my research in such a way that

- there is no apparent legal objection to the nature or the method of research; and
- the research will not compromise staff or students or the other responsibilities of the University;
- the stated objective will be achieved, and the findings will have a high degree of validity;
- limitations and alternative interpretations will be considered;
- the findings could be subject to peer review and publicly available; and
- I will comply with the conventions of copyright and avoid any practice that would constitute plagiarism.

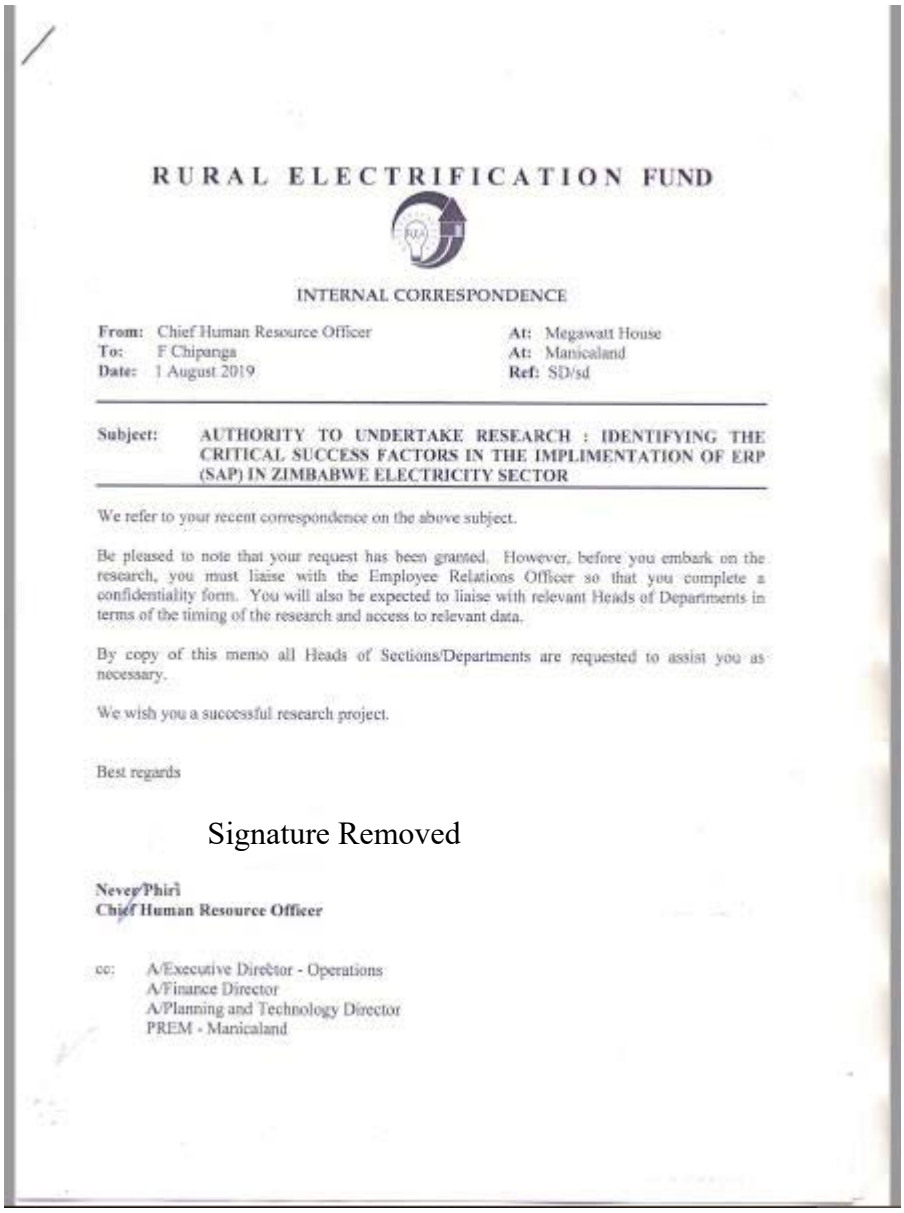
Signed by:

	Full name and signature	Date
Principal Researcher/Student:	Fibian Chipanga Signature Removed	10/05/2019

This application is approved by:

Supervisor (if applicable):	Dr Nlau-Tsu Tuan	10 May 2019
HOD (or delegated nominee): Final authority for all assessments with NO to all questions and for all undergraduate research.	Signature Removed	
Chair: Faculty EIR Committee For applicants other than undergraduate students who have answered YES to any of the above questions.	Signature Removed	30/5/2019

Appendix B. Research Approval by REA Chief Executive



RURAL ELECTRIFICATION FUND

INTERNAL CORRESPONDENCE

From: Chief Human Resource Officer
To: F Chiparga
Date: 1 August 2019

At: Megawatt House
At: Manicaland
Ref: SD/sd

Subject: **AUTHORITY TO UNDERTAKE RESEARCH : IDENTIFYING THE CRITICAL SUCCESS FACTORS IN THE IMPLIMENTATION OF ERP (SAP) IN ZIMBABWE ELECTRICITY SECTOR**

We refer to your recent correspondence on the above subject.

Be pleased to note that your request has been granted. However, before you embark on the research, you must liaise with the Employee Relations Officer so that you complete a confidentiality form. You will also be expected to liaise with relevant Heads of Departments in terms of the timing of the research and access to relevant data.

By copy of this memo all Heads of Sections/Departments are requested to assist you as necessary.

We wish you a successful research project.

Best regards

Signature Removed

Never Phiri
Chief Human Resource Officer

cc: A/Executive Director - Operations
A/Finance Director
A/Planning and Technology Director
PREM - Manicaland

Appendix C: Confidentiality and Consent Form

Confidentiality and Consent Form

Research Topic: Identifying the Critical Success Factors in the implementation of Enterprise Resource Planning (ERP) in Zimbabwe electricity energy sector.

Researcher: Fibian Chipanga

Dear Participant,
I am a student enrolled in the part-time Masters programme of the Construction Economics and Management at the University of Cape Town. As part of the course requirements I am expected to submit a research report.

I am inviting you to participate in this research survey. The purpose of my research is to identify the critical success factors in ERP implementation and understand the criticality of each factor from the perspective of the implementation team and users. By doing this the organisation can judge and allocate its resources effectively to achieve the success of ERP implementation.

Your participation in this research will be greatly appreciated. Participation is entirely voluntary and all information will be treated as confidential, anonymous and will be used solely for the purpose of this study. There are no risks to you or your privacy and REA if you decide to join this study by taking part in the exercise.

The findings of this research study will be compiled in a report that will be presented to the University of Cape Town for academic purposes. Participants' details will not be

published as part of the report and all participants will remain anonymous. I will be happy to share my results with you if you are interested.

If you have any questions regarding the survey, or about the being in this study, you may contact me at CHPFIB001@myuct.ac.za or phone +263 77 351 2222. I hope you will view this as an important matter, and spare of your time as your participation represents a valuable contribution to this research project.
If you are willing to participate in this study, please sign the attached consent form.

Thank you for your time and participation.

I, _____, consent to participate and be interviewed for the purpose of this research study.

I am aware that participation is voluntary and that I may choose to withdraw from this study at any time if I so wish.

……. ……

Signature Date

Appendix D: Sample Questionnaires

Interview Schedule guideline

Research Topic: Identifying the Critical Success Factors in the implementation of Enterprise Resource Planning (ERP) in Zimbabwe electricity energy sector.

Background Information

To obtain primary data for my research I intend to interview the past and current project participants at the Rural Electrification Agency. The plan is to interview the participants face to face at their place of work or through the telephone if it is not possible to meet them face to face.

The interviews time will be planned and agreed beforehand. All interviews will be recorded with the consent from the interviewee.

Participant: SP0

Date:

Time:

Medium: In person/Phone

IN --------- Interviewer

SP --------- Interviewee

1. Opening.

A. (Establish Rapport) I want to thank you for taking the time to meet with me today. My name is Fibian and as a member of this organisation I thought it would be a good idea to interview you, so that I can be better informed about the implementation of SAP you are involved in.

B. (Purpose) I would like to ask you some questions about your opinion on the factors you believe are important to the success of SAP implementation project and some experience you have had in order to learn how the implementation can be a success.

C. (Motivation) I hope to use this information to help the organisation to become more aware of the factors necessary for the successful implementation of ERP systems.

D. (Time Line). The interview should take about 30 minutes. Are you available to respond to some questions at this time? I will be taking some notes during the session.

All responses will be kept confidential. This means that your interview responses will only be shared with research team members and we will ensure that any information we include in our report does not identify you as the respondent. Remember, you don't have to talk about anything you don't want to and you may end the interview at any time.

Are there any questions about what I have just explained?

Are you willing to participate in this interview?

Interview Questions

Personal Information

IN. *What is/was your specific role in the organisation? (Primary, Closed)*

SP0:

IN: *How long have you been/ were you involved on the in the implementation of SAP project? (Primary, Closed).*

SP0:

IN: *What SAP project implementation activities(s) were you involved in? (Primary, Closed)*

SP0:

Context and Background.

IN: *What were the compelling reasons which led REA to adoption and implement SAP as an ERP system for the organisation?*

SP0:

Projects Implementation.

IN: *Which criteria do you use to measure the success of SAP (ERP) implementation? (Primary, Closed) Description of project being within budget, scheduled implementation plan and functionality.*

SP0:

IN: *Did you experience any challenges/issues in the implementation of activities which you were involved in? (Primary, Closed)*

SP0:

IN: *Please share the details of the challenges/issues you experienced? (Primary, Open*)

SP0:

IN: *In your opinion, what are the factors that caused the challenges/issues that you have just mentioned? (Primary, Open)*

SP0:

IN: *What do you think are the critical success factors in the ERP implementation? (What management should do in order for SAP to be a success?) (Primary, Open).*

SP0:

IN: *Which ones do you think are the most critical/important factors? (Primary, Open)*

SP0:

Clearing House: The Interviewee's turn.

IN: *Is there anything you would like to add or share? (Primary, Open).*

SP0:

IN: *Is there anyone else you would recommend I speak to? (Primary, Bipolar)*

SP0:

3. Closing

A (Summarising) Well, it has been a pleasure finding out more about you. Let me briefly summarize the information that I have recorded during our interview.

B (Maintain Rapport) I appreciate the time you took for this interview. Is there anything else you think would be helpful for me to know so that I can successfully compile a comprehensive report?

C. (Action to be taken) I should have all the information I need. Would it be alright to call you if I have any more questions?

.

Thank you for your time.

Appendix E: Completed Questionnaires

Participant: **SP04**

Date: **11/06/2020**

Time: **10.30am**

Medium: In Person OR Phone **Person**

IN --------- Interviewer

SP --------- Interviewee

Interview Questions

Personal Information

IN. *What is/was your specific role in the organisation? (Primary, Closed)*

SP04: Manager

IN: *How long have you been/ were you involved on the project? (Primary, Closed).*

SP04: **5years**

IN: *What project implementation activities(s) were you involved in? (Primary, Closed)*

SP04: I was involved in the planning stages of the whole projects. This involved the specification and selection of the consultants as well as the Software. I was also one of the leading team member of the implementation team. Also as a team leader for the Projects system and Sales and distribution modules

Context and Background.

IN: *What were the compelling reasons for the organisation which led it to adoption and implementation of SAP as an ERP system for the organisation?*

SP04: There was need to automate the organisation business processes. This was also going to facilitate the centralisation of data storage, integration of business systems and linking of organisational sections

Projects Implementation.

IN: *Which criteria do you use to measure the success of ERP implementation? (Primary, Closed) Description of project being within budget, scheduled implementation plan and functionality.*

SP04: I would think functionality of the system will be a good measure of how to measure success.

IN: *Did you experience any challenges/issues in the activities which you were involved in? (Primary, Closed)*

SP04: Yes

IN: *Please share the details of the challenges/issues you experienced? (Primary, Open*)

SP04: The resources were not readily available when needed. At times the team members not released in some case

IN: *In your opinion, what are the factors that caused the challenges/issues that you have just mentioned? (Primary, Open)*

SP04: Work commitments in the respective work stations caused the managers to release the team members at times late sighting work commitments.

IN: *What do you think are the critical success factors in the ERP implementation? (Primary, Open).*

SP04: Project management skills were lacking in some team members, also the team was not as diversified as I would think should be. Business reengineering process there was too much customisation of the system to suit the new system, the consultants at times failed to understand the business process and

operation of REA. There is need to for best fit for the system and organisational strategy. Lack of training lead to the lack of appreciation by the users. Top management support is needed throughout the implementation of the project. Users fear that the system may render the jobs redundant so they resisted using the system.

IN: ***Why do you think they are critical/important? (Primary, Open)***

SP04: Top management support and commitment are very important because they are the once in control of the resources and are responsible for their distribution. Also customisation of the business processes is also important for system realise the intended benefits.

Clearing House: The Interviewee's turn.

IN: *Is there anything you would like to add or share? (Primary, Open).*

SP04: **It is important to have full knowledge of the capability of the system.**

IN: *Is there anyone else you would recommend I speak to? (Primary, Bipolar)*

SP04: Super users and users can give more useful information

3. Closing

A (Summarising) Well, it has been a pleasure finding out more about you. Let me briefly summarize the information that I have recorded during our interview.

B (Maintain Rapport) I appreciate the time you took for this interview. Is there anything else you think would be helpful for me to know so that I can successfully compile a comprehensive report?

C. (Action to be taken) I should have all the information I need. Would it be alright to call you if I have any more questions?

.

Thank you for your time.